

AFIT/GCM/LSM/93S-4



# TOWARD ALTERNATIVE METRICS FOR MEASURING PERFORMANCE WITHIN OPERATIONAL CONTRACTING SQUADRONS: AN APPLICATION OF BENCHMARKING TECHNIQUES

THESIS

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THESIS

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Logistics and Acquisition Management
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Degree of Master of Science in Contracting Management

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## Abstract

The purpose of this study is to present a performance evaluation system based upon benchmarking techniques as an alternative method of assessing performance within operational contracting squadrons.

The research focused upon four main objectives: (1) determine all the performance factors that currently exist within a typical contracting squadron; (2) determine which of these factors are considered significant for measuring organizational performance; (3) determine whether a benchmark can be established for each of these factors; and (4) determine whether a viable performance evaluation system can be developed based upon benchmarking techniques.

To accomplish these objectives, an extensive review of literature pertaining to performance evaluation systems was conducted. This review centered on the characteristics of effective performance evaluation systems. These characteristics were compared to the current inspection system employed by the Air Force and inconsistencies were identified. Using this information, benchmarking techniques were applied in an effort to incorporate the characteristics of an effective contracting performance evaluation system. Recommendations were offered to the Air Force contracting community and suggestions for future research were given.

# TOWARD ALTERNATIVE METRICS FOR MEASURING PERFORMANCE WITHIN OPERATIONAL CONTRACTING SQUADRONS: AN APPLICATION OF BENCHMARKING TECHNIQUES

## I. Introduction

### Overview

For many years, organizational managers have aspired to achieve optimal performance within their organizations. This pursuit of excellence defines a manager's role within an organization and presents a daunting challenge for these select individuals. To achieve optimal performance, a manager must strive for increased organizational effectiveness. Organizational effectiveness itself is a fundamental element of an organization's ability to competently operate and succeed in today's working environment. Albanese refers to organizational effectiveness as "the bottom line, . . . the reason for managerial work." (Albanese, 1975:ix). Further understanding of the term organizational effectiveness requires an accepted definition of effectiveness. "The term [organizational] effectiveness relates to the accomplishment of an organization's goals and objectives. An organization is effective when its goals are accomplished; it is ineffective when they are not" (Herbert, 1989:588).

There is no question that organizations strive to achieve optimal effectiveness, but all organizations vary in ability and performance level. To adequately assess organizational performance, an effective performance evaluation system must be used. Herbert states:

> management control involves the measurement and evaluation of program activities to determine if policies and objectives are being accomplished as efficiently and effectively as possible. . . Management control provides the basic structure for coordinating the day-to-day activities involved in ensuring that the organization's resources are appropriately used in the pursuit of goals and objectives. (Hebert, 1989:591)

Many different types of performance evaluation systems exist. The challenge to the organizational manager is determining and implementing a system that will effectively assess organizational performance.

To address this challenge, this study will review and analyze both industry and government organizational performance evaluation systems and apply the findings to the development of an alternative evaluation system that is capable of measuring performance within a specific function of the Department of Defense (DOD)--Air Force operational contracting squadrons. The benefits associated with this alternative evaluation system may well result in improved organizational performance.

Chapter I will provide an introduction to the general issue, research problem, and investigative questions. Further, the chapter will address definitions associated

with the thesis effort, in addition to the scope of the research. Finally, the chapter will discuss the mission and structure of an operational contracting squadron, as well as the performance evaluation system currently used to assess operational contracting squadron performance.

General Issue

In order for the military services to successfully operate in today's changing environment, the DOD, and in turn the Air Force, have identified a need to reorganize and downsize. At the same time, all military organizations are challenged with the task of increasing their overall levels of efficiency and effectiveness (Air Force Policy Letter, 1990:1). In order to adapt to this changing environment, the Air Force has embarked upon a journey toward a quality revolution. This revolution requires a culture change and a competitive, customer-focused workforce whose goal is continuous process improvement (Alvarado, 1993:8).

Since 1992, the Air Force has been moving toward the concept of a Quality Air Force (QAF) which is directed at continuously improving quality and productivity by use of a variety of time-proven management methods and numerous statistical and analytical tools (Bossert, 1993:16). Within this movement, one of the major taskings organizational managers are facing is the development of an adequate performance evaluation system capable of assessing

organizational performance (Danis, 1993:4). Since the development of the current Air Force performance evaluation system occurred prior to the implementation of the QAF concept, it appears the current system fails to incorporate many of the principles of this new concept.

Realizing this inadequacy, Colonel Robert Cordano, Chief of Contracting, Air Combat Command (ACC), has challenged all ACC contracting personnel to find an alternative performance evaluation system capable of assessing contracting squadron performance in this new environment. In his letter dated 8 October 1992, Colonel Cordano states that a "beneficial thesis effort could be directed at establishing a metric or metrics to determine the effectiveness of a given contracting squadron's support to the wing's mission needs." This letter is included as Appendix A to this thesis.

## Problem Statement

With the changing acquisition environment and the push toward a Quality Air Force, a metric to assess overall effectiveness within contracting squadrons must be developed. The purpose of this thesis is to address this need by presenting an alternative performance evaluation system capable of assessing organizational performance within this new acquisition environment.

## Investigative Questions

Four investigative questions will guide the thesis effort. The four questions are:

1. What performance factors currently exist within a typical contracting squadron?

2. Which of these performance factors are considered significant for measuring organizational performance and therefore should be included in the development of an effective performance evaluation system?

3. Can a benchmark be established for each significant performance factor?

4. Can a viable performance evaluation system, capable of accurately measuring overall effectiveness for a typical contracting squadron, be developed using benchmarking techniques and concepts?

## Scope of the Study

The scope of this study is limited to:

1. Air Force Operational Contracting Squadrons within the Continental United States (CONUS) in a peacetime environment.

2. The perceptions and attitudes of Squadron Commanders, Deputy Base Contracting Officers (DBCO), and Executive Noncommissioned Officers (NCO) within each operational contracting squadron.

## Contracting Squadron Responsibilities and Structure

Contracting squadrons are operational units located at base installations throughout the CONUS and overseas. Currently, 119 squadrons exist within the Air Force, 86 within the CONUS (Directory of Air Force Operational

Contracting Activities, 1993:A1-A12). The primary responsibilities of contracting squadrons are to solicit, review, award, and administer all contracting actions for an operational base, as well as analyze and coordinate all contracting data and contracting matters that may affect base operations (AFR 70-8, 1979:1).

Air Force Regulation 26-1 states that the typical contracting squadron is assigned a Squadron Commander, Deputy Base Contracting Officer, and Executive NCO. Together with administrative support personnel, these individuals comprise the senior management element of the operational contracting squadron. These individuals oversee the daily operation of four flights. The four flights are Construction, Services, Commodities, and Management and Analysis Support.

The first flight, Construction, is responsible for purchasing and administering all construction projects, as well as providing architect-engineering support design for certain projects. Construction projects are normally limited to alteration, repair, or maintenance of existing facilities. Examples of construction contracts include the repair or replacement of built-up roofs, renovation and refurbishment of existing structures, and the removal of underground fuel storage tanks.

The Services Flight is responsible for all contracts that provide service support for base operations. Examples

of service contracts include vehicle rental, laundry and dry cleaning, military family housing maintenance, as well as purchase and administration of many smaller service requirements.

The third flight, Commodities, is responsible for purchasing and administering a variety of commodities and equipment contracts. Examples of commodities contracts include the purchase of typewriter ribbons, storage buildings, and medical supplies.

The final flight, Management Analysis and Support, is not responsible for purchasing and administering contracts. Instead, this flight is responsible for operating and maintaining the Base Contracting Automated System (BCAS) which provides data and information with respect to overall squadron performance. Data and information is provided to the senior management element in the form of monthly computer reports.

Current Evaluation Procedures

In order for an organization to assess performance, an evaluation system must exist that provides performance feedback to the organization. The current method of evaluation for all Air Force organizations is the Air Force Inspection System. This system is used by the Inspector General (IG) when conducting a Unit Effectiveness Inspection (UEI) of contracting squadrons. As stated in AFR 123-1, Air

Force Inspection System, the specific purposes of the inspection system are:

(1) Measure US Air Force readiness, as shown in operational unit and system discipline and performance.

(2) Measure the effectiveness and efficiency of units, functions, programs, and guidance.

(3) Evaluate Air Force and unit internal controls and identify good management methods for crossfeed to other units.

(4) Help define command priorities to units to perform their designated missions.

(5) Validate and compare management information reported through other staff agencies.

(6) Follow up on corrective actions taken on previously identified deficiencies.

(7) Detect and prevent fraud, waste, and abuse.

(8) Identify and resolve readiness issues and other important problems (AFR 123-1, 1989:5).

This particular evaluation system is conducted by the IG to evaluate the overall performance of an operational contracting squadron. The actual checklists and inspection guides implemented throughout the inspection are based upon performance factors, or indicators, reported and tracked through BCAS reports.

Definitions

1. ACC -- Air Combat Command

2. AFMC -- Air Force Materiel Command

3. Air Force Inspection System -- method of assessing the efficiency of management as well as the effectiveness

and economy of operations, usually accomplished by the Air Force Inspector General during a Unit Effectiveness Inspection.

4. AMC -- Air Mobility Command

5. ATC -- Air Training Command

6. BCAS report -- Base Contracting Automated System report. Monthly, quarterly, and yearly report that tracks all contracting actions and information in order to provide performance information.

7. Benchmark -- means to evaluate performance between similar organizations.

8. Contract Administration Lead Time (CALT) -- the elapsed time between receipt and fulfillment of a purchase request.

9. Deputy Base Contracting Officer (DBCO) -- the senior ranking civilian within the operational contracting squadron, subordinate only to the squadron commander. Focal point for all civilian matters as well as numerous contracting actions.

10. Executive NCO -- usually the senior ranking enlisted member within the squadron; almost always the most experienced and knowledgeable individual among enlisted members within the squadron.

11. Organizational Effectiveness -- the degree to which an organization satisfies or achieves its goals, objectives, or mission.

12. Performance Evaluation System -- a system, based upon accurate and meaningful performance measures, capable of evaluating organizational performance with respect to overall effectiveness.

13. Performance Measure -- factors, or indicators, of work activity found within an organization, capable of being used in a performance evaluation system to evaluate overall organizational effectiveness.

14. Senior Management Element -- senior management of an operational contracting squadron; usually comprised of Contracting Squadron Commander, Deputy Base Contracting Officer, and Executive NCO.

15. Squadron Commander/Base Contracting Officer -- the senior ranking military officer within an operational contracting squadron with decision making authority for all squadron matters as well as numerous contracting matters.

16. Unit Effectiveness Inspection -- Air Force inspection of operational units within the Air Force, conducted by the Inspector General every 12 to 18 months.

## Summary

The environment in which the military is presently operating has changed dramatically over the past several years. Force reduction and reorganization, as well as the move toward total quality, has impacted the manner in which all military organizations now perform their mission.

Operational contracting squadrons are no different. Even in a changed environment, organizational effectiveness remains one of the primary concerns for senior management.

The manner in which operational contracting squadrons now perform their mission has created a need to review and update the way the squadron measures and evaluates performance. The system used to evaluate contracting squadron performance was developed and implemented prior to the move toward total quality. In an effort to improve quality, this thesis will address those areas concerned with the development of an alternative performance evaluation system, such that the proposed system is capable of measuring performance for an operational contracting squadron.

# II. Literature Review

## Overview

The concept of organizational effectiveness implies different things to different individuals and can be assessed using diverse evaluation systems. These disparate evaluation systems possess both advantages and disadvantages and must be reviewed by the organizational manager to determine which one allows for accurate and meaningful assessment of the organization's performance.

This chapter will explore the concept of organizational effectiveness and the many types of performance evaluation systems used to assess performance, as well as the benefits of evaluating performance. Based upon this review, the authors will then decipher the applicable concepts that will be applied in this research. Next, the chapter will focus on the Air Force evaluation system along with the perceived limitations associated with this system. Finally, the chapter will conclude with a description of benchmarking and its potential for satisfying the limitations identified with the current Air Force system.

## Organizational Effectiveness

Organizational effectiveness is one of the most important aspects of any organization's performance. Steers refers to the pursuit of organizational effectiveness as the basic responsibility of management (Steers, 1976:55).

Furthermore, an organization's level of effectiveness is a direct measure of how well the organization is performing its mission, and it is usually the responsibility of the organizational manager to ensure the organization is performing as effectively as possible. Albanese contends:

> the main reason for managerial positions is that they presumably contribute to improving the job results of other people. Through their own job performance, managers are supposed to help others perform more efficiently and effectively. . . Managers are accountable for performance. (Albanese, 1975:17)

The responsibility of the contracting squadron commander is no exception. Working for both the Logistics and Wing Commanders, the contracting squadron commander is required to ensure organizational effectiveness. It is for this reason that the organizational manager, and particularly the contracting squadron commander, possess a working knowledge of the concept of organizational effectiveness.

Numerous definitions have been developed to describe organizational effectiveness. Anthony and Herzlinger believe that an organization's effectiveness can be measured by the extent to which its outputs accomplish its goals (Anthony, 1980:5). Duncan states that organizational effectiveness is more than efficiency. The effective firm is efficient; it is adaptive to change; and it maintains a satisfactory level of social equilibrium (Duncan, 1981:370). In the purchasing context, van Weele defines organizational

effectiveness as the relationship between actual and planned performance (van Weele, 1984:20). For a contracting squadron, organizational effectiveness may be viewed from van Weele's perspective. For example, a contracting squadron commander may set a goal of processing 500 purchase requests over the next week. In order to achieve organizational effectiveness with respect to this goal, the contracting squadron must match or exceed this planned performance.

The importance of achieving organizational effectiveness cannot be denied. Albanese refers to the attainment of organizational effectiveness as a performance goal, and these goals represent the main rationale for the existence of jobs (Albanese, 1975:51). To achieve this goal, the organization must be evaluated and appraised properly so that the resulting measures provide adequate feedback to the organizational manager. Albanese states that in order to be useful to a manager, goals should be measurable, otherwise it is difficult to know when the goal has been accomplished (Albanese, 1975:54).

To help determine the accomplishment of goals, management should rely on the proper metric or performance evaluation system in which to gauge progress. The selected metric or performance evaluation system must use the proper performance factors to provide adequate feedback for the manager of an organization. Only through sufficient

performance evaluation systems will the manager be able to achieve the bottom line--organizational effectiveness (Szilagyi 1980:457).

Benefits of Evaluating Performance

According to Arjan van Weele, there are four benefits to evaluating purchasing performance. First, evaluation leads to better decision making because it identifies variances from planned results. These variances can be analyzed to determine their causes and action to take to prevent them in the future. Second, evaluating purchasing performance makes things visible. Regular reporting of actual versus planned results enables the individual to verify whether his or her expectations have been realized and provides constructive feedback regarding individual and group effectiveness. Third, measuring purchasing performance may contribute to better motivation. Properly designed, an evaluation system can meet personal and motivational needs of the employee and can be effectively used in a constructive goal setting, motivational, or personal development program. Fourth, measuring purchasing performance may lead to better communication between departments as well as other organizations and in the long run, improve mutual understanding between departments and foster a team effort (van Weele, 1984:18).

These four benefits discussed by van Weele can also apply to a contracting squadron. Once a contracting squadron commander identifies substandard performance, a determination can be made as to what caused the substandard performance and what action will correct it. Reporting the planned versus actual performance provides a squadron commander the opportunity to address a particular area and provide feedback with respect to whether the actual performance is considered effective. Feedback provided to a squadron commander through performance evaluation can provide a means to increase or improve motivation within the organization. Finally, if a contracting squadron commander is aware of the squadron's performance with respect to overall effectiveness, it might be easier and more meaningful to discuss performance between flights and organizations.

Performance Evaluation Systems

In reviewing the literature, it is apparent that there are many different performance evaluation systems currently in place. Numerous benefits and limitations are associated with these diverse systems and consequently the selected performance evaluation system must complement the organization it is evaluating.

Performance evaluation seeks to evaluate the overall success of the chosen course of action and to identify where

improvements might be made to more fully realize the projected program benefits (Herbert, 1989:599). In an Air Force context, if a contracting squadron has 200 open purchase requests in its possession and takes action to close out 150, the resulting performance can be reviewed to determine what course of action might have allowed the squadron to close out all 200 purchase orders.

Types of Performance Evaluation Systems. Many different approaches exist for assessing organizational effectiveness. Cameron states that evaluators have used four approaches to define and assess organizational effectiveness. These approaches are (1) goal, (2) system resource, (3) process, and (4) strategic constituencies (Cameron, 1980:68).

The goal approach is the most widely used and defines effectiveness in terms of how well an organization accomplishes its goals. Evaluators using this approach focus on the outputs of an organization. The closer the organization's outputs come to meeting its goals, the more effective the organization.

Under the system resource approach, an organization's effectiveness is judged on the extent to which it acquires needed resources. The more of the needed resources an organization can obtain from its external environment, the more effective the organization.

The process approach holds that effective organizations are those with an absence of internal strain, whose members are highly integrated into the system, whose internal functioning is smooth and typified by trust and benevolence toward individuals, and where information flows smoothly both vertically and horizontally. Organizations are more effective if they possess a greater degree of these internal characteristics, less effective if they possess a lesser degree of these characteristics.

The final approach, strategic constituencies, also referred to as the participant satisfaction model, defines effectiveness as the extent to which all of the organization's strategic constituencies are at least minimally satisfied. A strategic constituency is any group of individuals who have some stake in the organization. For example, a strategic constituency would include resource providers, users of the organization's products or services, or those whose lives are significantly affected by the organization. In this approach, the effectiveness of an organization is based on how well it responds to the demands and expectations of its strategic constituencies. Advocates of the strategic constituencies approach have usually emphasized external constituencies, those powerful groups outside the organization that have a significant impact on its functioning.

Each of the four approaches identified by Cameron provide useful guidelines for systematically assessing the effectiveness of organizations, and all of the approaches could be considered by a contracting squadron commander. The goal approach is especially useful when organizational goals are clear, consensual, and measurable. The goals a contracting squadron commander and other squadron personnel set and their attainment are the keys to this approach.

The system resource approach is most useful when there is a clear connection between resources received by the organization and what it produces. For a contracting squadron commander, an example of a systems resource would be manpower. The higher the number of personnel assigned to the contracting squadron, the higher the number of completed purchase requests.

The third approach, process, is most appropriate when the internal processes and procedures of an organization are closely associated with what the organization produces, or with its primary task. An example of this approach in contracting would involve a contracting squadron's level of effectiveness and its relationship to the internal processes accomplished by the contracting personnel while performing their jobs.

The final approach, strategic constituencies, is most appropriate when external constituencies have a powerful influence on the organization's operations or when an

organization's behavior is largely reactive to strategic constituency demands. This approach is probably the most applicable to contracting squadrons because contracting squadrons are service organizations tasked with providing the best customer support possible.

All of the approaches discussed by Cameron are analytically independent and therefore only one of them is generally appropriate for assessing most types of organizations. Identifying which approach is appropriate for a particular organization is based in part upon the manner in which the organization desires to measure effectiveness (Cameron, 1980:79). Regardless of the approach adopted, it should satisfy the user's requirements and be accepted as valid in previous efforts (Campbell, 1981:72).

In addition to the model suggested by Cameron, recent literature proposes other models capable of evaluating purchasing performance. Pooler suggests that one model available and worthy of consideration is Total Recognition of Environmental and Numerical Development. This model states that the best standard for a purchasing department is its own past performance. Data regarding such performance factors as number of purchase orders, dollar purchases per year, and dollars saved per year should be tracked over the last five years. Using this data, trend analysis can be accomplished and the findings used to determine the overall

effectiveness of a purchasing department (Pooler, 1973:69). Trend analysis is one method that is presently being used by many operational contracting squadron commanders. The BCAS report provides data in the form of a monthly report for many different performance factors present within the contracting squadron. Using these reports, squadron commanders can analyze and evaluate data with respect to past performance.

Similar to the model presented by Pooler, Croell contends that quantitative measures of purchasing performance should be used as the basis for evaluating overall purchasing performance. These measures should be established after reviewing the particular function of the purchasing department to determine which areas of performance are important to the successful completion of the department's overall mission. Measures identified by Croell as important include dollar purchases, purchases as a percent of sales, and number of purchase orders. The performance level of these areas could then be used to measure the effectiveness of the purchasing department (Croell, 1980:23).

Van Weele refers to purchasing effectiveness as the relationship between actual and planned performance and purchasing efficiency as the relationship between planned and actual sacrifices made in order to realize a goal previously agreed upon. Based upon these definitions, van

Weele suggests that an effective performance evaluation system should measure both purchasing efficiency and effectiveness. Van Weele further states that when establishing a performance evaluation system, the following guidelines should be utilized. First, evaluation systems should be designed in a manner that corresponds with the daily operations of the buyer involved. Second, the buyer should participate in the establishment of standards for his or her activities. Third, performance feedback should be provided to the buyer on a timely basis so this information can be used when taking corrective action when necessary. Finally, standards for evaluating purposes should be set only in those areas for which the buyer can be legitimately held responsible (van Weele, 1984:18).

Another purchasing evaluation system is one proposed by Cavinato who contends that purchasing effectiveness should be measured from the viewpoint of non-purchasing personnel who are considered the customer. These individuals might be from the engineering, production, accounting or other non-purchasing departments. Cavinato states that the level of effectiveness within the purchasing department is a direct measure of the level of customer service provided in the following areas: (1) speed of obtaining products or service; (2) reliability in obtaining products or services; (3) perceived effort in price/quality options search and selection; (4) convenience in processing requisitions; (5)

advance information about potential supplier deviations from quality, quantity, or delivery commitments; and (6) assistance with special problems by the purchasing department (Cavinato, 1987:10).

Szilagyi and Wallace state that an effective performance evaluation system is based upon reliable and valid performance measures. Reliability is a product of consistency and stability. Consistency demands that two alternative methods of gathering the same data should agree substantially in their results. Stability demands that the same measuring device should provide the same results time after time, as long as the characteristic it is supposed to be assessing does not change (Szilagyi, 1980:449).

Collins and Harris point out that a shift is taking place in the way purchasing performance is measured. Performance evaluation systems are moving away from using traditional purchasing measures and in their place are using measures that encourage continuous improvement. Traditional measures, such as purchase price variance were once the predominant source of performance evaluation information. Purchasers were rewarded when their price was lower than the standard and penalized when the costs were above the standard. Using rewards and punishment in this manner caused purchasers to spend time pursuing methods to beat those standards rather than carrying out activities they knew were important (Collins, 1992:10).

In a sense, the same principles apply in the Air Force environment where many operational squadrons commit the majority of their time preparing for the upcoming Unit Effectiveness Inspection instead of concentrating on providing the best customer support possible. Srikanth states:

> all employees, whether they be managers, supervisors, or hourly workers, are influenced by the performance evaluation measures currently used. . . their behavior and performance simply reflect the standards of the existing evaluation system. (Umble, 1990:12)

Instead of traditional measures, many managers are selecting meaningful measures that are more representative of the work performance and the value added by the purchasing function (Collins 1992:10).

Srikanth echoes some of Collins' and Harris' opinions, particularly with regard to traditional measures. Srikanth states that traditional performance measures have become obsolete because the global **seller's market** they were designed to serve no longer exists. The shortcoming of these measures in today's **buyer's market** is their lack of focus on competitive elements. Srikanth also states that any new, effective system of measures must address four critical areas that are lacking in traditional measures. First, the system should be able to track customer satisfaction. In competitive environment, customers must be satisfied or market share will decrease. Second, the system should be able to track relevant financial

performance. The new system must be able to answer the basic question: Are we making money? Third, the system should be able to track competitive performance. In a competitive environment, customers are comparing your performance to that of your competition, therefore, every attempt should be made to identify competitors and periodically benchmark their performance against yours. Fourth, the system should be able to track local indicators to see how effectively sub-units are managing materials and resource assets. Examples of such indicators are inventories, levels of scrap and rework, and overtime (Srikanth, 1992:51).

In addition to these models, the Center For Advanced Purchasing Studies has developed a model based upon benchmarking techniques which provides a standard or point of reference to measure or judge quality, value, or competition. Benchmarking ultimately provides the manager with information with respect to best-in-industry performance and allows for improvement to be made in less than industry-best areas (Seaman, 1992:8).

Principles of an Effective Performance Evaluation System. Only certain principles found within these models are applicable to the operational contracting squadron when developing performance evaluation systems. Reasons for this include the following. First, contracting squadrons are non-profit organizations and are not concerned with

achieving a profit such as a purchasing department within the civilian sector. Second, contracting squadrons operate in a military environment that is regulated by stringent laws, rules, and regulations that must be followed. Finally, due to force reductions and reorganization, contracting squadrons are often forced to operate with limited personnel. Considering the unique environment in which a contracting squadron functions, the following principles should be considered during the development of a performance evaluation system.

1) Performance measures should embrace continuous improvement.

2) Performance measures should be reliable and valid.

3) Evaluation systems should be designed with the participation of the user and should be related to the user's daily operations.

4) Effective performance evaluation systems should provide a method to assess performance of competitive or peer organizations.

5) Measures should be quantitative.

The remainder of the chapter will examine the current inspection system employed by the Air Force, as well as the perceived dissimilarities between the Air Force system and this list of principles. Finally, the chapter will address benchmarking as a proposed measure that may be useful in eliminating some of these dissimilarities.

Current Air Force Evaluation System

The performance evaluation system currently employed by the Air Force is based upon principles and guidelines found within AFR 123-1, The Air Force Inspection System. The objective of the Air Force Inspection System is to provide feedback on the capability of Air Force units to perform their assigned missions. More specifically, the inspection system:

> (1) measures the effectiveness and efficiency of units, functions, programs, and guidance;
>
> (2) evaluates Air Force and unit internal controls and identifies good management methods as well as validating and comparing management information for possible improvement;
>
> (3) suggests changes in resource allocation to improve current operations or to plan future activities. (AFR 123-1, 1989:5)

Air Force Regulation 123-1 uses the following criteria to assign inspection ratings to Air Force organizations. These inspection ratings are used as a measure of overall organization effectiveness. The ratings are as follows:

> (1) **Outstanding.** Performance or operation far exceeds mission requirements. Procedures and activities are carried out in a far superior manner. Resources and programs are very efficiently managed and are of exceptional merit. Few if any deficiencies exist.
>
> (2) **Excellent.** Performance or operation exceeds mission requirements. Procedures and activities are carried out in a superior manner. Resources and programs are very efficiently managed and relatively free of deficiencies.
>
> (3) **Satisfactory.** Performance or operation meets mission requirements. Procedures and activities are carried out in an effective and competent manner.

Resources and programs are efficiently managed. Minor deficiencies may exist but do not impede or limit mission accomplishment.

(4) **Marginal.** Performance or operation does not meet some mission requirements. Procedures and activities are not carried out in an efficient manner. Deficiencies exist that impede or limit mission accomplishment.

(5) **Unsatisfactory.** Performance or operation does not meet mission requirements. Procedures and activities are not carried out in an adequate manner. Resources and programs are not adequately managed. Significant deficiencies exist that preclude or seriously limit mission accomplishment. (AFR 123-1, 1989:6-7)

Perceived Limitations. The list of principles used to develop the performance evaluation system currently employed by the Air Force to assess operational contracting squadron performance varies dramatically from the list identified by numerous researchers within the field of purchasing. The Air Force holds the following principles important. First, performance criteria are most effective when they are developed by staff functional areas and subsequently employed by inspector generals. Second, performance criteria should define the standards against which the inspected unit and functional areas are compared when determining inspection ratings and should provide inspection guidance broad enough to facilitate inspector judgment. Finally, performance criteria should define a logical balance of subjective and objective assessment (AFR 123-1, 1989:7).

Another aspect of the Air Force evaluation system involves the reliance on past performance. This reliance

forces an organization to compare itself to past performance using standards established by personnel other than the person whose performance is to be evaluated. Because of this, the evaluation system is primarily concerned with performance with respect to established standards, rather than concern for how the organization is performing with regard to competitive or peer organizations. As a result, individuals receiving inspections have little input into the system that is ultimately used to evaluate their performance.

Several dissimilarities exist between the list of principles of an effective performance evaluation system, and the principles upon which the Air Force evaluation system is based. First, the Air Force system is not established by those individuals who are evaluated. Second, the Air Force system does not provide the opportunity for an organization to compare its performance against its competitors or peers. Finally, the current Air Force evaluation system does not embrace continuous improvement.

A performance evaluation system based upon benchmarking principles may provide the means to eliminate these dissimilarities and ultimately improve the Air Force inspection system.

Benchmarking

For two decades after World War II, U.S. industry was not challenged by foreign competition in any market and consequently management became more concerned with simply meeting the high level of demand that existed in most markets rather than worry about integrating quality managerial and business techniques into their operations (Umble, 1990:7). In 1979, one such corporation, Xerox, was astonished when a Japanese competitor introduced a mid-size copier for under $10,000, an amount less than it cost Xerox to produce a similar copier. Convinced that the competitor had priced the copier below fair market value, Xerox began an earnest benchmarking study to determine the meaning behind the market price. The results of the study were staggering to the leaders of the Xerox Corporation. The study indicated that the Japanese competitor was radically more efficient in production operations (Port, 1992:74). Because of Xerox' success with identifying their competitor's new processes, manufacturing components, and costs of manufacturing, senior management decided to incorporate benchmarking as a corporate-wide effort. "Today, Xerox has regained market share, dramatically lowered cost and improved quality, and saved itself from financial disaster" (Pryor, 1989:28).

Prior to this revelation by the Xerox Corporation, most manufacturing and business firms employed traditional

measures consisting of internally developed standards utilizing budgeting procedures with adjustments for productivity and customer satisfaction (Camp, 1989:7). For the first time the benefits associated with benchmarking were realized and benchmarking has become a common component of the many Total Quality Management programs adopted by large companies since the introduction of benchmarking (Rothman, 1992:64).

Definition. The formal definition of benchmarking is "the continuous process of measuring products, services, and practices against the toughest competitors or those companies recognized as industry leaders" (Camp, 1989:10). Simply stated, benchmarking is the comparison of a given business function across companies and can be defined as (1) measuring your performance against that of best-in-class companies; (2) determining how the best-in-class achieve those performance levels; and (3) using the information as the basis for your own company's targets, strategies, and implementation (Pryor, 1989:28).

Types. Many different types of benchmarking have been identified within current literature. Pryor has identified three--strategic, operational, and business management benchmarking. Strategic benchmarking involves the comparison of different market strategies and a correlation of those strategies to marketplace success. Operational benchmarking focuses on a specific aspect of a company's

functional operations and identifies ways to achieve best-in-class status. Finally, business management benchmarking involves traditional support functions that are benchmarked in order to evaluate the worth of that function to the overall corporation (Pryor, 1989:28).

In addition to these three types, Camp identified three additional forms of benchmarking: (1) benchmarking against internal operations; (2) competitive benchmarking; and (3) generic benchmarking. Benchmarking against internal operations relates to the comparison of similar functions of internal operations within the same organization. Competitive benchmarking involves the comparison of direct product competitors. Its objective is to show what the competitive advantages and disadvantages are between direct competitors. Generic benchmarking refers to the comparison of business functions or processes that are the same regardless of industry (Camp, 1989:254).

Benefits. Traditionally, organizations have concentrated on tracking and analyzing internal trends as a means of evaluating performance. By doing so, the organization is actually comparing itself to its past performance. While this is a valid form of performance measurement, it does not provide information as to how performance compares to that of its peers (Seaman, 1992:8). Benchmarking can help address this problem by allowing an organization to compare itself to the best-in-class

organizations, quantify differences in performance, document why those differences exist, and identify steps to catch up to and surpass the best-in-class (Pryor, 1989:29).

Camp discusses five benefits to benchmarking. They are: (1) aid the organization in meeting customer requirements; (2) aid the organization in establishing effective goals and objectives; (3) provide a true measure of productivity; (4) enable the organization to become competitive; and (5) aid the organization in incorporating industry-best practices (Camp 1989:27). Table 2.1 summarizes Camp's rationale for benefits of benchmarking.

Table 2.1. Benefits Associated with Benchmarking

| Benefits of Benchmarking | Impact of not using Benchmarking |
|---|---|
| **1) Defining customer requirements** | |
| Market reality | Based on history or gut feel |
| Objective evaluation | Perception |
| High conformance | Low fit |
| **2) Establishing effective goals and objectives** | |
| Credible, unarguable | Lacking external focus |
| Proactive | Reactive |
| Industry leading | Lagging industry |
| **3) Developing true measures of productivity** | |
| Solving real problems | Pursuing pet projects |
| Understanding outputs | Strengths and weaknesses not understood |
| Based on industry best practices | Route of least resistance |
| **4) Becoming competitive** | |
| Concrete understanding of competition | Internally focused |
| New ideas of proven practices and technology | Evolutionary change |
| High commitment | Low commitment |
| **5) Industry best practices** | |
| Proactive search for change | Not invented here |
| Many options | Few solutions |
| Business practice breakthrough | Average of industry practice |
| Superior performance | Frantic catch-up activity |

Many of the benefits listed in Table 2.1 incorporate the concepts and perceived criteria needed for an effective performance evaluation system. For instance, as discussed in Chapter I, the Air Force is currently pursuing total

quality initiatives in which the focus is for Air Force organizations to become competitive and highly committed to new ideas of proven practices and technology. Furthermore, the Air Force is continually searching for industry-best practices with proactive ideas resulting in superior performance. Finally, for an organization to effectively perform its mission involves achieving customer satisfaction and this can only be accomplished by defining the customer's requirements. Regardless of who the organization's customers are, the leader of an organization must achieve customer satisfaction through the use of quality initiatives. Benchmarking techniques satisfy all of these objectives and provide the manager of an organization the necessary tools needed to evaluate organizational performance.

Despite the fact that there are many benefits associated with benchmarking, the results of a survey taken in 1991 of 87 member companies of the International Benchmarking Clearinghouse found that while "79 percent of those polled believed companies will have to benchmark to survive, 95 percent believed that most companies don't know how to do it" (Biesada, 1992:34). The results of this survey indicate that most managers understand the importance of benchmarking, but fail to incorporate benchmarking as a means to solve quality problems. Only recently has the Air

Force been involved with pursuing its own quality programs, such as benchmarking (Danis, 1993:4).

Process. According to Camp, the benchmarking process can be separated into five distinct phases. These phases are: (1) planning; (2) analysis; (3) integration; (4) action; and (5) maturity (Camp, 1989:17). These phases are summarized in Table 2.2.

Table 2.2. Camp's Five Phase Process for Benchmarking

| | |
|---|---|
| I. | Planning |
| | a. identify what is to be benchmarked |
| | b. identify comparative companies |
| | c. determine data collection method and collect data |
| II. | Analysis |
| | a. determine current performance "gap" |
| | b. project future performance levels |
| III. | Integration |
| | a. communicate benchmark findings and gain acceptance |
| | b. establish functional goals |
| IV. | Action |
| | a. develop action plans |
| | b. implement specific actions and monitor progress |
| | c. recalibrate benchmarks |
| V. | Maturity |
| | a. leadership position attained |
| | b. practices fully integrated into processes |

The first phase, planning, consists of three steps. The initial step is to determine what is to be benchmarked. To make this determination, the product of the business must be identified. This can be accomplished by analyzing the organization's mission statement to determine the outputs

for which the organization is responsible. Ultimately, the outputs that should be benchmarked are those that are measurable, have data readily available, and will provide useful information to organizational managers in their quest to improve the overall effectiveness of the organization. Once a determination has been made as to what factors are to be benchmarked, the next step is to identify comparative companies to benchmark against. Leader companies or organizations should be used to compare performance against because by doing so, superiority will be ensured. The third step in the planning phase is to determine an appropriate data collection method and to collect the data. There are an infinite variety of ways to obtain the required data, but a combination of methods that best meets the study needs will most often be productive.

Once the required data has been collected, the benchmarking process can move into the analysis phase. The first step to data analysis is to determine the current performance gap. This can be accomplished by actually assessing one's performance against other organizations to determine if the competitor is a better performer. If the determination is made that the competitor is a better performer then the questions, "By how much?" and "Why?" should be asked. The performance gap may be positive (no other organization is superior), negative (one or more organizations are superior), or one of parity (all

organizations are performing at the same level). Determining the performance gap enables the organization to move into the second step of analysis--projecting future performance levels. In this step, the organization must now decide whether its future performance should be directed toward closing the gap or to capitalize on a positive gap.

The third phase of benchmarking, integration, consists of two steps. The first step is to communicate benchmark findings and gain acceptance throughout the entire organization. To accomplish this, findings must be clearly and convincingly demonstrated as being correct and based upon substantive data. Once findings have been accepted, they can be converted into a statement of operational principles or functional goals.

The fourth phase of the benchmarking process is action. The action phase uses those principles and goals identified in the integration phase and attempts to convert them to an action process. Additionally, periodic measurement and assessment of achievement must be put into place as well as provisions for updating and recalibrating the established benchmarks.

The last phase of benchmarking is that of maturity which is reached when industry-best practices are incorporated in all organizational processes thereby enabling the organization to reach a position of leadership. In this phase, continuous improvement is essential as the

goal of benchmarking ultimately entails incorporation of industry-best practices and achieving organizational superiority (Camp, 1989:17).

## Conclusions

As identified earlier in this chapter, dissimilarities exist among the key principles found within the Air Force evaluation system and those used by purchasing departments within industry. First, performance criteria used by the performance evaluation system should be developed and established by the buyer or individual whose performance will be evaluated. This evaluation should not be accomplished at a level several tiers above the user level, such as the current Air Force inspection system which develops the system at the functional staff level. Camp states that because every function of a business should be considered a candidate for benchmarking, there is a critical need for senior management to orchestrate the benchmarking effort. Furthermore, to ensure effectiveness, benchmarking should ultimately be conducted by the people who will use it (Camp, 1989b:66). To solve this problem, benchmarking provides an evaluation system developed and implemented by those users who would be directly affected by the system.

Second, effective performance evaluation systems should provide the opportunity for the organization to compare performance against its competitors and peers. This concept

involves the fundamental precept upon which benchmarking is founded. Benchmarking is "the continuous process of measuring products, services, and practices against the toughest competitors or those companies recognized as industry leaders" (Camp, 1989:10). Implementing benchmarking as an alternative performance evaluation system would allow organizations within the Air Force to incorporate Air Force best practices and thus, internalize total quality initiatives as a means to improve overall performance.

Finally, effective performance evaluation systems should embrace continuous improvement. In this sense, benchmarking involves a continuous process of identifying the factors to be benchmarked, collecting the required data, establishing the benchmarks, determining the performance gap, communicating the benchmarking findings, developing action plans, implementing specific actions, and periodically assessing achievement of the benchmark and recalibrating or updating the benchmark. The process continues until the organization has reached a level of industry leadership, and even then, must continue to benchmark in order to remain superior. Similarly, the Air Force must also address the issue of continuous improvement, and benchmarking would provide the means of furnishing feedback to the organizational leaders as a basis for improved organizational decisions.

# III. Methodology

## Overview

The purpose of this chapter is to identify and discuss the methodology, procedures, and activities used in developing an alternative performance evaluation system. First, the chapter reviews the investigative questions which form the basis of the thesis and provide a focus for the research. Second, the chapter identifies the type of research design used to guide the study. Discussion of design involves the selection of performance factors, population and sample selection, and limitations associated with the research. In addition, research design will also address the survey instrument in detail--its development, structure, and overall purpose. Finally, the chapter will conclude with an in-depth analysis of each of the investigative questions.

## Restatement of Investigative Questions

Four investigative questions provide a focal point for the remainder of this chapter.

1. What performance factors currently exist within a typical contracting squadron?

2. Which of these performance factors are considered significant for measuring organizational performance and therefore should be included in the development of an effective performance evaluation system?

3. Can a benchmark be established for each significant performance factor?

4. Can a viable performance evaluation system, capable of accurately measuring overall effectiveness for a typical contracting squadron, be developed using benchmarking techniques and concepts?

## Research Design

The purpose of research design is to provide the technical aspects of the study and provide a means to document the methodology of the study so that findings can be replicated. This portion of the chapter will cover the following areas: selection of performance factors, population and sample selection, survey development, survey instrument, and limitations of the research design.

Selection of Performance Factors. A review of literature was conducted to identify all potential performance factors capable of measuring contracting squadron performance.

The first step needed to satisfy this objective involved establishing a potential list of all performance factors that currently exist within a typical contracting squadron. Development of this list required an extensive literature review and discussions with operational contracting personnel.

Available literature pertaining to contracting performance measures was reviewed to create an initial listing of performance factors found within a typical contracting squadron. Literature used in this search included the following: the IG Checklist dated 16 March

1991; AFLMC Report LC870309, Management Information Needs for the Base Contracting Office, March 1989; monthly BCAS data reports and Management Critiques from K.I. Sawyer AFB; Strategic Air Command Statistics Pamphlet (Oct 91-Feb 92); and the BCAS Users Guide.

In addition to the literature review, input was solicited from contracting personnel within the Air Force who had operational experience in the field of contracting. These individuals included present and prior contracting squadron commanders and deputy base contracting officers, contracting staff personnel at Air Combat Command, and professors of Contract Management at the Air Force Institute of Technology (AFIT).

The results of the literature review and personnel interviews were a compilation of 63 performance factors that are currently used to measure performance within a contracting squadron. These 63 performance factors can be found highlighted in bold print in Appendix B--Survey Instrument. This list of factors form the basis of the survey questionnaire.

Population and Sample Selection. As discussed in Chapter II, one of the perceived limitations involving the current Air Force inspection system is that the users fail to develop the system. Therefore, any input regarding the performance factors to be included in an evaluation system should be provided by the users. This perceived limitation

was addressed when selecting the representative population and sample to be studied.

The selection of the population and sample were determined with regard to accurate representation of the characteristics of the population to be represented. The population of concern for this research effort was determined to be all contracting squadron commanders, deputy base contracting officers, and executive noncommissioned officers assigned to any of the major commands located within the CONUS. These major commands include: Air Combat Command (ACC); Air Mobility Command (AMC); Air Force Materiel Command (AFMC); Air Training Command (ATC), Air University (AU); and Air Force Space Command (AFSC).

Emory and Cooper (1991), state the sampling technique selected should depend upon the requirements of the project, its objectives, and the availability of funds. Since one of the objectives of this study is to determine the general attitudes of contracting personnel with respect to performance factors that are important to effective contracting squadrons, quota sampling was selected to assure that the sample was representative of the population from which it was drawn (Emory, 1991:275). Quota sampling is a form of nonprobability sampling in which certain criteria are imposed. For this study, the researchers imposed the criteria specifying that the selected sample should provide meaningful input for the selected topic, and that the sample

represents a distribution in the population that is easily estimated. The resulting sample size totaled 258 people, which is considered large with respect to statistical analysis (McClave, 1991:85). Appendix C contains a list of all the operational contracting squadrons, by base, that were sampled.

Upon determining the population and sample, the decision was then made to utilize a survey instrument to gather information necessary for this thesis study. The reason for selecting a survey instrument to satisfy the objectives of the study is because use of a survey instrument provides the most feasible method to answer all of the investigative questions, and for this research the respondents are uniquely qualified to provide the desired input needed to answer the investigative questions. Other methods of collecting pertinent data were considered and the decision was made to develop an original survey instrument that specifically fit the needs of the research. Furthermore, the decision was also made to utilize mail surveys to satisfy the objectives of the study. This decision was based on several prominent factors with the most important attributed to funding and time constraints placed upon the research effort, and the inaccessibility of the majority of the selected sample. In addition, mail surveys are considered to be extremely practical because they allow for anonymity for the respondent, and provide

more time for the respondent to consider the questions and their responses (Emory, 1991:333).

To effectively consider all impacts associated with mail surveys, the authors also considered various methods for improving return rates. Receiving a high return rate is important because the higher the return rate, the more accurate the estimate will tend to be (McClave, 1991:85). In an effort to improve the return rate the following areas were addressed: inclusion of self-addressed return envelopes, cover letter clearly explaining the benefits of the study, assurance of anonymity for the respondent, and deadline due date.

Reasons for limiting the sample to only those bases located within the CONUS were threefold. First, contracting procedures and regulations vary between CONUS and overseas contracting squadrons. This inherent variation may create significant differences among the perceptions of those individuals assigned to either a CONUS or overseas location. Additionally, this variation may result in differences in the manner in which the different contracting squadrons determine the level of importance among different performance factors. Second, due to limited response time, monetary considerations, and the long mail time often associated with overseas installations, the researchers determined that an overseas sample may not be feasible. Finally, analysis of only CONUS installations would still

provide statistically significant results due to the large sample size. Large sample statistics involve smaller sampling errors, greater reliability, and increases the power of the statistical tests applied to the data (Isaac, 1985:189). Furthermore, the Central Limit Theorem assures us that, for a large sample test of hypothesis, "the test statistic will be approximately normally distributed regardless of the shape of the underlying probability distribution of the population" (McClave, 1991:356).

Survey Development. In order to effectively evaluate the selected sample, the authors developed a survey instrument that was used to collect data to answer the research questions. Isaac (1985), states that the guiding principles underlying surveys is that they should be systematic, representative, objective, and quantifiable. These four principles were critically considered during the survey development.

Development of the survey involved several steps to ensure a systematic, representative instrument capable of measuring the essential areas needed for the research. The first step involved including all of the 63 performance factors that were previously identified through the research. Next, it was discovered that another Graduate Contract Management thesis team was conducting a similar research study. This team was interested in determining performance factors needed for measuring productivity and

efficiency. Since the other thesis team was considering the same population sample, and their selected performance factors were very similar to ones identified within this research, the determination was made to mail out a joint survey capable of collecting information required for both thesis teams. This decision was based upon the perceived threats that may arise with two separate surveys using similar subjects and format, and attempting to gather information from a similar sample. Furthermore, mailing out two similar surveys to the same sample may introduce biased results for either the number of overall survey responses received, or actual question responses themselves.

Once the initial survey was drafted, a pretest was conducted using ten individuals within the AFIT Graduate Contract Management section who had operational contracting squadron experience as either squadron commanders or flight chiefs. Fink (1985), states that the purpose of a pretest is threefold: (1) measure the practicality of the survey; (2) determine the validity of the survey; and (3) interpret the reliability of the survey.

Practicality of the survey alludes to a determination as to the interpretability of the survey. Upon review of the survey responses from the pilot group, it was determined that all directions, questions, and instructions were clear because all surveys were completed as anticipated without

questions or requests for clarification from the pilot group.

The second purpose of the pretest, validity, refers to whether the survey measures what it is supposed to measure. Results gathered during the pretest of the survey supported the fact that the survey did gather attitudinal responses from the respondent with respect to determining the performance factors that are important to the overall effectiveness of an operational contracting squadron.

The final purpose of the pretest was to assess the reliability of the survey. Reliability of the survey refers to the accuracy and precision of the measurement procedure. Since the results received by all ten members of the pilot group were fairly consistent in their responses, it gave the indication that the survey was also reliable.

In addition to the review conducted by the pilot group, the survey was also reviewed for validation purposes by the Air Force Logistics Management Agency at Gunter AFB. One of the main responsibilities of this office is identifying, researching, and solving problems facing operational contracting squadrons. This review did not result in any substantive changes to the list of performance factors.

As a result of the initial reviews and feedback received from the pilot test, no changes were made to the original list of performance factors. The final survey instrument is found in Appendix B.

Survey Instrument. Part I, Background, was designed to collect demographic information which could be used to determine the individual differences among the respondents. In this part, the respondents were asked to provide information regarding their experience level with respect to total contracting experience, total experience in their present position, major command to which they are assigned, and opinions concerning performance evaluation systems.

Part II, Organizational Performance Factors, contains a list of 83 performance factors to be rated by the respondent. Because the survey was a compilation of two different research efforts, some of these performance factors measured effectiveness, while others measured productivity or efficiency. Only those performance factors that measure effectiveness were of concern in this thesis effort.

To effectively measure performance, a five point Likert scale was developed to provide input for analysis. This scale was chosen because it can be treated as an interval scale which provides the opportunity to use parametric analysis techniques. These techniques include determining the mean response, standard deviation for each question, and tests for significance between populations (McClave, 1991:307). The following scale was included on the survey instrument: (1) definitely not important; (2) somewhat not

important; (3) neutral; (4) somewhat important; and (5) definitely important.

Part III, Additional Performance Factors, provided a means for the respondent to add any additional performance factors they determined important for measuring contracting performance which were not included among the original list of 63. Inclusion of this part was twofold. First, receiving input from the respondents validates the initial list of performance factors developed by the researchers. Second, write-in responses allow the researchers to expand the list of performance factors to include any additional factors that may be important in measuring performance.

Part IV, Overall Performance, asked the respondents to select, from the list of 63 factors included on the survey and any additional factors included in Part III, the five performance factors they felt were the most important in measuring organizational performance within an operational contracting squadron. To provide effective feedback, the respondents were asked to rank order these five factors in order from first in importance to fifth in importance. This rank order will provide necessary information used for identifying the most crucial factors in measuring performance.

Part V, Overall Performance Of Your Squadron/Organization, asked the respondent to rank the overall performance of their assigned organization. The

answer choices were determined from a segmented scale that range from, Unsatisfactory to Outstanding. The respondents were asked to answer this part based on their personal perception concerning the effectiveness of their organization, and not to consider the input received from their last IG rating or command evaluation. The purpose of this part was to provide the opportunity to evaluate the individual's preference of most important performance factors to how well they considered their squadron to be performing.

Part VI, Desirable Characteristics of a Performance Evaluation and Feedback System, was placed on the survey by the other thesis team. The information provided by the respondent in this part was of no concern for this particular research effort.

Part VII, Additional Comments, provided the survey respondent the opportunity to make any additional comments they felt were important to the research effort and to request a copy of the completed thesis. Although this section has little statistical value for the thesis effort, the comments may point out strengths and weaknesses of the survey instrument or the research effort in general.

Limitations of Research Design. Several potential limitations exist with the research design utilized for this study. One potential source of error lies in the fact that oftentimes respondents only respond to mail surveys in which

the respondents feel comfortable with the survey questions and material (Emory, 1991:333). For example, if an organization recently received an Unsatisfactory or Marginal rating, then there may be a higher probability that these individuals would not return a survey dealing with performance factors since they might not be as interested in the topic. On the other hand, those individuals that were recently involved with receiving a Satisfactory or higher IG rating are most likely to be interested in the survey content and more apt to participate in the research study. Based on these predicted inputs, the results of the mail survey may be skewed and biased providing a potential limitation for the research. This potential limitation will be analyzed in Chapter IV, by presenting the demographic information for all the survey respondents and drawing conclusions about the results indicated.

Another potential limitation involves the constraints imposed upon performance factor selection. The list of 63 performance factors was limited to those quantitative factors that were both measurable and available to the authors through literature reviews or personal interviews with contracting personnel.

A final limitation involves population inferences that were made involving the selection of only CONUS bases for the quota sample. Quota sampling was selected based upon

the premise that sampling CONUS bases would provide an accurate representation for all contracting squadrons.

## Analysis of Investigative Questions

To adequately analyze the data used throughout the thesis process, a detailed description will be provided that will list each investigative question and provide the means by which the question will be answered.

Analysis of Investigative Question Number One. What performance factors currently exist within a typical contracting squadron?

The purpose of this question was to establish a definitive list of all performance factors present within a typical contracting squadron that are capable of measuring performance. An initial list of 63 performance factors was developed as explained in the literature review and discussions described earlier in this chapter. These factors were placed on the survey described earlier and mailed to contracting personnel within the CONUS. To ensure the list was definitive, the survey respondents were asked to add any additional factors they considered important and may be useful in measuring organizational effectiveness.

Analysis of Investigative Question Number Two. Which of these performance factors are considered significant for measuring organizational performance and therefore should be

included in the development of an effective performance evaluation system?

The purpose of this investigative question was to evaluate the list of performance factors that were assembled in question one and to analyze these factors by means of a survey questionnaire. Responses by the sampled population will provide data that can be analyzed to determine the importance of each performance factor to be used as a performance measure for organizational effectiveness. Analyzing the results received from the survey responses will determine which factors from the definitive list of performance factors were statistically significant for measuring organizational effectiveness and therefore should be included in an alternative performance evaluation system. Using the five-point Likert scale discussed earlier, survey respondents assigned a rating of importance for each performance factor. From these individual ratings, a mean level of response was calculated for each performance factor. Using the mean level of response, the performance factors were then rank ordered from highest to lowest mean. Table 3.1 summarizes the large-sample test of hypothesis that was applied to the rank ordered list to determine which factors were actually significant compared to the original list of 63. An $\alpha$ of .05 and $\mu_0=4$ was used to determine the most significant factors at a 95 percent confidence level. This approach in determining significance is appropriate

because the purpose of the research is to determine those factors that are most significant for use in an alternative performance evaluation system. By comparing the mean for a performance factor, $\mu$, against $\mu_o$=4, somewhat important, only those factors that are the most significant will be determined. This determination will be made by the test statistic rejecting the null hypothesis that the means are the same and accepting the alternate hypothesis that the means are significantly different.

Table 3.1. Large Sample Test of Hypothesis About $\mu$

One-Tailed Test

$H_o$: $\mu = \mu_o$
$H_a$: $\mu < \mu_o$
[or $H_a$: $\mu > \mu_o$]

Test Statistic:

$$z = \frac{x - \mu_o}{\sigma_x}$$

Rejection region: $z < -z_\alpha$
(or $z > z_\alpha$ when $H_a$: $\mu > \mu_0$)

Analysis of Investigative Question Number Three. Can a benchmark be established for each significant performance factor?

The purpose of this investiga ive question was to determine which of the factors determined to be significant in investigative question two are actually capable of being benchmarked. As stated in Chapter II, factors to be

benchmarked must be measurable, have data readily available, and provide useful information to the organizational manager. Using these criteria, the list of significant factors from investigative question number two was reviewed to determine which factors actually met these criteria. All factors meeting these criteria can then have benchmarks established for them.

Working with this constraint, the authors made the determination that in order for a factor to be considered for the proposed benchmark performance measure, the factor must meet one of two criteria. First, the factor must be currently tracked and measured by the monthly BCAS report prepared at each operational base, thus providing a current data source for the benchmarking methodology. Second, if the selected performance factor is not currently measured by BCAS, then the factor must have an available data source that can be used for the purpose of benchmarking. An example of a performance factor in the latter category is that of an IG rating received by a contracting squadron. Despite the fact that IG ratings are not tracked by the BCAS report, this factor could still be used as a benchmark since data involving IG ratings are readily available.

The reason for developing a survey with performance factors that are not currently measured is to identify all potential factors that could be useful in measuring organizational performance. One facet of the research was

to determine those factors that are significant even if data is not currently being collected. Identification of these significant performance factors is crucial in the development of an alternative evaluation system.

Analysis of Investigative Question Number Four. Can a viable performance evaluation system, capable of accurately measuring overall effectiveness for a typical contracting squadron, be developed using benchmarking techniques and concepts?

The purpose of this question was to determine if a system based upon benchmarking techniques can provide a viable alternative performance evaluation system to assess operational contracting squadron performance. As discussed in Chapter II, benchmarking offers a comparative analysis among similar organizations so that an organizational manager is able to assess the relative effectiveness of the organization. Additionally, benchmarking identifies those organizations that are best-in-class allowing other organizations to assess and analyze those specific characteristics that led them to achieve this success. Before this comparative analysis can take place, the raw data must be collected to determine the range for each category that is to be benchmarked. To answer this question, the principles of benchmarking must be applied. Investigative questions two and three have determined what factors to benchmark. Data must now be gathered regarding

each significant performance factor and used to establish a mean, maximum, and minimum level of performance. These performance levels should then be presented to all contracting squadrons for comparison purposes. Each individual squadron's performance level could be compared against a benchmark so that the senior management element could determine how effective the squadron was performing. Squadron personnel could use this information to determine future work actions.

The actual benchmarks were calculated from data found in the BCAS data report dated 1 October 1992 for operational contracting squadrons within ACC. ACC was selected for several reasons. First ACC is currently the largest command in terms of the number of active operational bases, and therefore analysis of this command would provide a larger representative sample in which to benchmark. Second, ACC provided the largest survey response rate and therefore, represents a viable command in which to provide benchmarks. Finally, the Chief of Contracting for ACC expressed interest in the development of an alternative performance evaluation system, and therefore, use of ACC for the sample benchmarks is appropriate. Additionally, future research could take these findings and apply them to all other major commands to determine if benchmarking provides a viable means for measuring performance among operational contracting squadrons.

As of 1 October 1992, 37 operational contracting squadrons existed within ACC, and therefore, all of the data gathered from the BCAS report for each of these squadrons was used for the purpose of benchmarking. Summaries of the gathered data are broken down into four different categories labeled total, average, minimum, and maximum.

Total refers to the summation of data for the particular performance factor. For instance, total for the number of delinquent contracts would represent the total number of delinquent contracts for all of ACC. Average refers to the overall average number of delinquent contracts for the command. Average is determined by simply dividing the total figure by the number of squadrons. Minimum pertains to the smallest figure for each of the factors within the command. Using number of delinquent contracts as an example, the minimum figure would represent the least number of delinquent contracts found for a particular squadron within ACC. Finally, maximum refers to the greatest figure for each of the factors found within the command. Maximum for the number of delinquent contracts would represent the figure for the squadron with the greatest number of delinquent contracts. Consequently, the numbers presented for minimum or maximum can be viewed as either negative or positive depending upon which performance factor is being analyzed.

## Summary

The purpose of this chapter was to present the methodology used to answer the four investigative questions that provide the focus for the research. To answer the four investigative questions, the appropriate research design must be incorporated.

For this research, the research design involved the selection of performance factors found within a contracting squadron that are capable of measuring performance. Review of applicable literature resulted in a list of 63 factors capable of measuring performance for a contracting squadron. Additionally, research design involved the selection of all operational contracting squadrons located within the CONUS for the population and selection of the senior management element as the sample. Research design also discussed the chosen instrument used in the research, and perceived limitations associated with research design. Finally, the chapter concluded with a discussion of the four investigative questions that direct the thesis effort. The outcome of this analysis is presented in Chapter IV.

# IV. Data Analysis and Findings

## Overview

This chapter analyzes and evaluates the data received from the survey respondents in an attempt to present an alternative performance evaluation system using benchmarking techniques. First, the survey response rate is addressed, followed by a discussion of survey respondent demographics. Next, each of the four investigative questions are addressed. Analysis of investigative question one will include a list of all performance factors present within a typical contracting squadron. Investigative question two will describe the procedures accomplished to determine the specific performance factors considered significant to the overall study. Investigative question three will discuss which of these factors are capable of being benchmarked. Finally, investigative question four will provide benchmarks for those factors identified in investigative question three, followed by a discussion of how a squadron commander could effectively incorporate the concepts of benchmarking to measure organizational performance.

## Survey Analysis

A total of 258 surveys were mailed to all operational contracting units within the CONUS. Three surveys, to be completed by the Commander, Deputy Base Contracting Officer,

and Executive NCO were mailed to each contracting squadron listed in Appendix C. As of 1 January 1993, a total of 86 operational units were located within the CONUS, and of these 86 units, 66 bases provided useable input from at least one respondent. Of the 258 surveys that were administered, 165 (63.95 percent) of the surveys were returned with 153 (59.3 percent) of these surveys useable. Receiving a useable return rate of 59.3 percent for a mail survey can be considered well above average (Emory, 1991:333). According to Isaac and Michael (1985), at least 59 percent of a sample should provide useable information when a study is preparing to make a reliable inference about a population sample of 258 people. Overall, 12 surveys were returned that were not considered useable. The most common reason for not using a returned survey was because the respondent failed to answer all of the survey questions.

Table 4.1 summarizes information pertaining to the survey response rates by showing a breakdown by MAJCOM and total figures for each category. The row that is titled **Other** includes all responses received from commands other than ACC, AMC, AFMC, and ATC. Responses received from other commands include Air University and Air Force Space Command. Further, the table provides information on how many surveys were sent out and how many of the returned surveys were considered useable.

Table 4.1. Response Rates

| Commands | Sent out | Used | % Used |
|---|---|---|---|
| ACC | 111 | 77 | 69.37% |
| AMC | 48 | 25 | 52.08% |
| AFMC | 39 | 13 | 33.33% |
| ATC | 39 | 23 | 58.97% |
| Other | 24 | 15 | 62.50% |
| **Total** | **258** | **153** | **59.30%** |

Demographic Data

Part I of the survey consisted of questions concerned with gathering information on population demographics and IG opinion questions. The purpose of asking demographic questions was to receive pertinent information from the sampled population in order to assess the background, experience, and related characteristics of the selected sample. The results of these questions can be seen in Table 4.2. The column labeled **Average Contracting Experience** represents the average number of years a person has in contracting. The final column labeled **Average Number of Months** represents the average number of months that the respondents have spent in their present job position.

Table 4.2. Demographic Data

| Command | Number of Officers | Number of Civilians | Number of Enlisted Personnel | Average Contracting Experience | Average Number Months in Present Position |
|---|---|---|---|---|---|
| ACC | 24 | 24 | 29 | 15.5 | 37.29 |
| AMC | 11 | 5 | 8 | 11.8 | 25.96 |
| AFMC | 4 | 7 | 2 | 15.7 | 36.15 |
| ATC | 7 | 11 | 5 | 15.4 | 41.22 |
| Other | 5 | 5 | 5 | 17.3 | 35.07 |
| **Total** | **51** | **52** | **49** | **15.10** | **35.78** |

The results shown in Table 4.2 indicate that the selected sample has a great deal of contracting experience and contains evenly distributed input from officer, civilian, and enlisted personnel. Further, the average contracting experience for the respondents is 15.10 years followed by an average of 35.78 months in their present position. Both of these statistics add to the credibility of the survey responses by indicating that the respondents have a vast amount of experience in the areas in which they were providing feedback.

Performance Evaluation Opinion Questions. Survey questions six through nine pertain to the Air Force IG system and address those issues concerning development of an alternative evaluation system. As discussed in Chapter II, the purpose of the Air Force IG is to provide feedback to commanders on the capability and effectiveness of operational Air Force units. Using the rating criteria that was discussed in Chapter II, Table 4.3 summarizes IG inspection results as asked in the survey and answered by the respondents.

Table 4.3. IG Information

IG results

| | O | E | S | M | U | N/A | Total |
|---|---|---|---|---|---|---|---|
| ACC | 1 | 15 | 14 | 0 | 0 | 0 | 30 |
| AMC | 0 | 4 | 6 | 0 | 0 | 1 | 11 |
| AFMC | 1 | 1 | 3 | 0 | 0 | 2 | 7 |
| ATC | 0 | 7 | 3 | 1 | 0 | 0 | 11 |
| Other | 1 | 1 | 3 | 0 | 0 | 2 | 7 |
| Total | 3 | 28 | 29 | 1 | 0 | 5 | 66 |

*O=Outstanding, E=Excellent, S=Satisfactory, M=Marginal, U=Unsatisfactory, N/A=Not Applicable

The purpose of summarizing Table 4.3 was to receive a better understanding of the background of the respondents and to have a better assessment of the selected sample that participated in the research effort. By asking the respondents what rating they received on their last IG, the authors received an indication of what sample is providing survey input for analysis. For instance, the results of Table 4.3 indicate that the occurrence of either an Excellent or Satisfactory rating is extremely high, 86 percent, while the proportion of units receiving either an Outstanding, Marginal or Unsatisfactory rating is very slim, 4 percent, 2 percent and 0 percent, respectively.

Tables 4.4 and 4.5 addresses two opinion questions that were covered in the survey. The first question, question

number eight on the survey, involves the effectiveness of the current IG evaluation system. The question reads:

**The current command IG evaluation system satisfactorily measures organizational performance.**

1. **Strongly disagree**
2. **Disagree**
3. **Neutral**
4. **Agree**
5. **Strongly agree**

The purpose of this question was to solicit feedback from the senior management element within contracting about their satisfaction with the current method of evaluation. If the results of this question indicate a low response, any value less than 3.0, then this input may further substantiate the fact that the current IG system does not satisfactorily measure organizational performance. In addition to analyzing the results of this one opinion question, careful attention must be given to the results of survey question number eight compared to that of question number nine.

Survey question number nine solicits feedback from the respondents with respect to whether an alternative performance evaluation system would be useful in measuring organizational performance. The question reads:

**An evaluation system, different from the command IG, would be useful in measuring overall organizational performance.**

1. **Strongly disagree**
2. **Disagree**
3. **Neutral**
4. **Agree**
5. **Strongly agree**

The purpose of this question was to determine whether the respondents have a preference for the development of an alternative evaluation system. If the respondents indicate that another evaluation system would be useful, the creditability of the overall research effort is increased. In addition, if the mean response to survey question number eight is less than 3.0, and the mean response to survey question number nine is greater than 3.0, then the results require further investigation. If the two mean responses differ significantly from each other, the conclusion may be that the survey respondents are no longer satisfied with the current performance evaluation system and an alternative method may be useful.

The summary of the two opinion questions included in the survey can be found in Table 4.4.

Table 4.4. IG Opinion Questions

**Opinion of effectiveness regarding current IG evaluation system (Survey question #8)**

| | 1 | 2 | 3 | 4 | 5 | Avg |
|---|---|---|---|---|---|---|
| ACC | 2 | 19 | 29 | 26 | 1 | 3.06 |
| AMC | 2 | 6 | 7 | 8 | 1 | 3 |
| AFMC | 4 | 3 | 5 | 1 | 0 | 2.23 |
| ATC | 3 | 8 | 4 | 7 | 1 | 2.78 |
| Other | 1 | 6 | 3 | 5 | 0 | 2.8 |
| Total | 12 | 42 | 48 | 47 | 3 | 2.91 |

**Opinion of creating an alternative evaluation system (Survey question #9)**

| | 1 | 2 | 3 | 4 | 5 | Avg |
|---|---|---|---|---|---|---|
| ACC | 1 | 5 | 29 | 35 | 7 | 3.55 |
| AMC | 1 | 5 | 7 | 8 | 4 | 3.36 |
| AFMC | 0 | 2 | 6 | 1 | 4 | 3.54 |
| ATC | 0 | 2 | 4 | 13 | 4 | 3.83 |
| Other | 0 | 0 | 2 | 11 | 2 | 4 |
| Total | 2 | 14 | 48 | 68 | 21 | 3.60 |

*1=Strongly disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly agree

In order to determine the significance of the responses, a two-tailed large sample test of hypothesis for $(\mu_1 - \mu_2)$ was conducted at the 99 percent confidence level. The following table (Table 4.5) shows the formula for conducting this test.

Table 4.5 Large-Sample Test of Hypothesis for $(\mu 1-\mu 2)$

**Two-Tailed Test**

$H_o$: $(\mu_1-\mu_2)= D_o$

$H_a$: $(\mu_1-\mu_2)\neq D_o$

[or $H_a$: $(\mu_1-\mu_2)>D_o$]

where $D_o$= Hypothesized difference between the means which is 0)

Test Statistic:

$$z = \frac{(x_1 - x_2) - D_o}{(x_1 - x_2)}$$

where

$$(x_1 - x_2) = \sqrt{\frac{\sigma x_1^2}{n_1} + \frac{\sigma x_2^2}{n_2}}$$

Rejection region: $z < -z_{\alpha/2}$ or $z > z_{\alpha/2}$

where $\alpha/2=.005$

The calculated values for the z-test are z=3.45 and $z_{\alpha/2}$=2.576 with the results of this test rejecting the null hypothesis that the two population means are the same, and therefore accepting the alternative hypothesis that the means are significantly different. This result indicates that the respondents may perceive the current IG evaluation method as not adequately measuring performance and a new performance evaluation system is needed. The results of survey question eight and nine help validate the purpose of this thesis effort by indicating the respondents desire for a new performance evaluation system.

Analysis of Investigative Question Number One

Investigative question number one reads:

**1. What performance factors currently exist within a typical contracting squadron?**

The purpose of this question was to determine whether an exhaustive list of performance factors could be tabulated and evaluated in a survey instrument. Chapter III discussed how the authors selected performance factors to be included on the survey and what criteria was used in the selection process. Using this methodology the authors arrived at a final list of 63 performance factors that was evaluated on the survey. Table 4.5 lists these 63 factors found on the survey instrument.

Table 4.6. List of Performance Factors

| Question Number | Performance Factor |
|---|---|
| 10 | Number of open purchase requests |
| 11 | Number of small business goals achieved |
| 12 | Last IG rating |
| 13 | Command or higher contracting awards |
| 14 | Outstanding Unit Citation |
| 15 | Number of contracts behind schedule |
| 16 | Total number of delinquent contractors |
| 17 | Number of SF 129 packages mailed |
| 18 | Number of new vendors identified and loaded in BCAS |
| 20 | Number of STEP promotions |
| 21 | Number of protests received |
| 22 | Number of protest successfully defended |
| 23 | Total number of ratifications |
| 24 | Percentage of competitive actions |
| 26 | Total number of contracting actions |
| 27 | Total number of centralized actions |
| 28 | Total number of decentralized actions |
| 29 | Total dollars awarded competitively |
| 30 | Number of interest payments paid due to late processing of contractor invoice |

Table 4.6. Continued

| Question Number | Performance Factor |
|---|---|
| 31 | Number of contracts awarded using source selection |
| 32 | Number of undefinitized actions |
| 33 | Number of BPAs administered |
| 35 | Number of amendments due to contracting error |
| 36 | Number of customer education classes provided |
| 37 | Number of man-hours expended to support deployments, etc. |
| 39 | Number of in-house proficiency training sessions |
| 40 | Number of squadron Operating Instructions |
| 41 | Number of self inspections conducted |
| 42 | Number of Value Engineering Change Proposals received |
| 43 | Number of Value Engineering Change Proposals approved |
| 44 | Percent of time BCAS is available to users |
| 45 | Number of purchase requests over 90 days |
| 46 | Number of purchase requests over 120 days |
| 47 | Number of vendor follow-ups due to late delivery |
| 49 | Number of walk-through purchase requests |
| 61 | Total number of line items received priority 1-8 |
| 62 | Total number of line items received all priorities |
| 63 | Number of different customer organizations served by contracting |
| 64 | Total dollars awarded |
| 65 | Total number of modifications |
| 66 | Priority 1-3 CALT |
| 67 | Priority 4-8 CALT |
| 68 | Priority 9-15 CALT |
| 69 | The overall average CALT |
| 70 | Total number of Non-Appropriated Fund actions |
| 71 | Total Non-Appropriated Fund dollars awarded |
| 72 | Total number of Section 8A actions |
| 73 | Total Section 8A dollars awarded |
| 74 | Total number of line items awarded |
| 75 | Total number of centralized line items awarded |
| 76 | Total number of decentralized line items awarded |
| 77 | Total centralized dollars awarded |
| 78 | Total decentralized dollars awarded |
| 83 | Total set-aside actions awarded |

Table 4.6. Continued

| Question Number | Performance Factor |
|---|---|
| 84 | Total number of large business actions awarded that were available for small business |
| 85 | Total large business dollars awarded that were available for small business |
| 86 | Ratio of small business dollars awarded divided by total dollars available for small business |
| 87 | Percentage competitive dollars measure |
| 88 | Total number of active contracts |
| 89 | Total number of active A&E and construction contracts |
| 90 | Total number of active service contracts |
| 91 | Total number of commodities contracts |

In addition to the 63 performance factors that were considered on the survey the authors also analyzed the write-in responses recorded in Part IV of the survey. The purpose of this part of the survey was to solicit feedback from the respondents on any performance factor that may have been missing from the list found on the survey. Of the 166 surveys that were received, 81 (49 percent), included at least one write-in response. These responses are shown in Table 4.7.

Table 4.7. Write-in Responses

| Write-in response | Number of responses |
|---|---|
| Customer support and satisfaction | 32 |
| Recognition programs | 4 |
| Customer support lead time | 4 |
| Additional duties | 4 |
| Customer training | 4 |
| TQM training | 4 |
| Contingency procurement and trained personnal | 3 |
| DD 350 errors | 2 |
| Morale | 2 |
| Employees award program | 1 |
| Adequate facilities and parking | 1 |
| QAE trained | 1 |
| Total QAE appointed | 1 |
| Government dollars saved | 1 |
| Personnel turnover | 1 |
| Vendor training | 1 |
| Environmental contracts | 1 |
| Disciplinary actions | 1 |
| Number of congressionals | 1 |
| Number of solicitation review comments | 1 |
| Number of contract review comments | 1 |
| Number of modification review comments | 1 |
| Number of legal review comments | 1 |
| Discrepancies per order | 1 |
| Overtime | 1 |

Analysis of the 25 write-in responses along with the 63 original performance factors indicates that there are potentially 88 performance factors that may be used to the measure the performance of an operational contracting squadron. These 88 factors will be further analyzed in investigative question two to determine which of these

factors are considered significant and should be included in an alternative performance evaluation system.

Analysis of Investigative Question Number Two

This portion of the chapter discusses investigative question number two which reads:

**2. Which of those performance factors are considered significant for measuring organizational performance and therefore should be included in the development of an effective performance evaluation system?**

The purpose of this question was to analyze the list of 63 performance factors found on the survey along with any of the factors that were included as a write-in response, and determine a final list of significant performance factors that could be used in the development of a performance evaluation system.

To determine the significant performance factors among the write-in responses, descriptive statistics will be employed. Through the use of this test only one response, customer support and satisfaction, is significant. This particular response generated input from 32 (20.92 percent) of the survey respondents, while the remaining write-in responses received less than two percent input from the respondents and therefore, none of the remaining write-in responses will be considered significant in this study.

For the remaining 63 performance factors, determination of significance involved a two-step process. First, the factors were sorted by rank order which was determined by

the calculated mean for each of the factors. After determining the rank order of the factors, the second step involved determining which of the factors are most significant and should be included in a benchmarking evaluation system. This step involved conducting a test of hypothesis that compares the means of two populations to provide input on which factors are most significant in relative importance. This process will be discussed in detail later in the chapter.

Table 4.8 presents a summary of each of these performance factors ranked from most important to least important. The column titled **mean level of importance** represents the average response for the 153 survey inputs and this figure determines the final rank order for each performance factor. The calculated averages are based on the scale of importance used on the survey--(1) Definitely not important; (2) Somewhat not important; (3) Neutral; (4) Somewhat important; and (5) Definitely important. Appendix D contains a table that lists the 63 performance factors in rank order along with average ratings for each of the MAJCOMs and ACC Staff. The reason for including this appendix is to present the differences that exist among commands in determining the importance of performance factors.

Table 4.8. Rank Order of Performance Factors

| Performance factor | Survey question number | Mean level of importance | Rank order |
|---|---|---|---|
| Number of purchase requests over 120 days | 46 | 4.699 | 1 |
| Number of purchase requests over 90 days | 45 | 4.536 | 2 |
| Number of contracts behind schedule | 15 | 4.503 | 3 |
| Percent of time BCAS is available to users | 44 | 4.484 | 4 |
| Number of man-hours expended to support deployments, etc. | 37 | 4.451 | 5 |
| Number of amendments due to contracting error | 35 | 4.418 | 6 |
| Total number of line items received all priorities | 62 | 4.373 | 7 |
| Total number of active service contracts | 90 | 4.366 | 8 |
| Total number of active contracts | 88 | 4.359 | 9 |
| Number of customer education classes provided | 36 | 4.317 | 10 |
| Number of protests successfully defended | 22 | 4.307 | 11 |
| Total number of line items received priority 1-8 | 61 | 4.307 | 12 |
| Total number of active A&E and construction contracts | 89 | 4.275 | 13 |
| Total number of commodities contracts | 91 | 4.248 | 14 |

Table 4.8. Continued

| | | | |
|---|---|---|---|
| Number of in-house proficiency training sessions | 39 | 4.222 | 15 |
| Number of open purchase requests | 10 | 4.190 | 16 |
| Total number of delinquent contractors | 16 | 4.190 | 17 |
| Number of interest payments paid due to late processing of contractor invoice | 30 | 4.176 | 18 |
| Total number of contracting actions | 26 | 4.163 | 19 |
| Percentage of competitive actions | 24 | 4.144 | 20 |
| Total number of modifications | 65 | 4.137 | 21 |
| Number of vendor follow-ups due to late delivery | 47 | 4.124 | 22 |
| Total dollars awarded competitively | 29 | 4.059 | 23 |
| Number of different customer organizations served by contracting | 63 | 4.039 | 24 |
| Total number of ratifications | 23 | 4.026 | 25 |
| Priority 1-3 CALT | 66 | 4.013 | 26 |
| Total number of line items awarded | 74 | 4.013 | 27 |
| Total number of centralized actions | 27 | 4.007 | 28 |
| Total number of centralized line items awarded | 75 | 3.980 | 29 |
| Number of walk-through purchase requests | 49 | 3.980 | 30 |
| Percentage competitive dollars measure | 87 | 3.954 | 31 |
| Priority 4-8 CALT | 67 | 3.935 | 32 |

Table 4.8. Continued

| | | | |
|---|---|---|---|
| Total number of large business actions awarded that were available for small business | 84 | 3.928 | 33 |
| Number of self inspections conducted | 41 | 3.889 | 34 |
| Total large business dollars awarded that were available for small business | 85 | 3.882 | 35 |
| Number of Reports of Discrepancy | 19 | 3.869 | 36 |
| The overall (average) CALT | 69 | 3.869 | 37 |
| The priority 9-15 CALT | 68 | 3.830 | 38 |
| Number of protests received | 21 | 3.817 | 39 |
| Number of undefinitized actions | 32 | 3.814 | 40 |
| Total Section 8A dollars awarded | 73 | 3.778 | 41 |
| Total set-aside actions awarded | 83 | 3.771 | 42 |
| Ratio of small business dollars awarded divided by total dollars available for small business | 86 | 3.771 | 43 |
| Total number of decentralized actions | 28 | 3.768 | 44 |
| Total centralized dollars awarded | 77 | 3.765 | 45 |
| Number of small business goals achieved | 11 | 3.758 | 46 |
| Total dollars awarded | 64 | 3.758 | 47 |
| Total number of Section 8A actions | 72 | 3.758 | 48 |
| Number of BPAs administered | 33 | 3.641 | 49 |

Table 4.8. Continued

| | | | |
|---|---|---|---|
| Total number of decentralized line items awarded | 76 | 3.608 | 50 |
| Outstanding Unit Citation | 14 | 3.490 | 51 |
| Total decentralized dollars awarded | 78 | 3.477 | 52 |
| Number of contracts awarded using source selection | 31 | 3.431 | 53 |
| Command or higher contracting awards | 13 | 3.408 | 54 |
| Last IG rating | 12 | 3.350 | 55 |
| Number of STEP promotions | 20 | 3.105 | 56 |
| Total number of Non-Appropriated Fund actions | 70 | 2.958 | 57 |
| Total Non-Appropriated Fund dollars awarded | 71 | 2.944 | 58 |
| Numbe of Value Engineering Change Proposals approved | 43 | 2.876 | 59 |
| Number of new vendors identified and loaded in BCAS | 18 | 2.824 | 60 |
| Number of squadron Operating Instructions | 40 | 2.797 | 61 |
| Number of Value Engineering Change Proposals received | 42 | 2.784 | 62 |
| Number of SF 129 packages mailed | 17 | 2.601 | 63 |
| Customer support and satisfaction | Write-in | N/A | N/A |

In order to sufficiently include all factors that are deemed significant based on input from the survey respondents, a test of hypothesis was conducted to determine which factors are most significant by comparing the population means for each performance factor against a

neutral response. The test involved a large sample one-tail z-test with an $\alpha$ of .05 to determine which factors are significantly important and should be included in a new performance evaluation system. The population mean that is under consideration involves the mean that was calculated for each individual performance factor against the response of 4, somewhat important, on the Likert scale. The reason for this selection was based upon the fact the overall mean for all performance factors was found to be 3.88 and therefore running the test of hypothesis found in Table 4.9 against a $\mu_o$ of 4 would provide results of the most significant factors from the original list. Table 4.9 contains the test of hypothesis that was used to determine the significant performance factors.

Table 4.9. Large Sample Test of Hypothesis About $\mu$

One-Tailed Test

$H_o$: $\mu = \mu_o$
$H_a$: $\mu < \mu_o$
[or $H_a$: $\mu > \mu_o$]

Test Statistic:

$$z = \frac{x - \mu_o}{\sigma_x}$$

Rejection region: $z < -z_\alpha$
(or $z > z_\alpha$ when $H_a$: $\mu > \mu_0$)

At the 95 percent confidence level, any factor that rejects the null hypothesis and accepts the alternative hypothesis is considered to be a significant factor. The results of this test indicate that 22 factors are significantly different from 4.0. Additionally, the write-in response, customer support and satisfaction, was also considered significant as described earlier, and therefore, a total of 23 factors were considered significant from the original list of factors. Appendix E contains the methodology results of the z-test. Table 4.10 contains the 23 significant performance factors in rank order from most important to least important based upon the calculated averages shown in Table 4.8.

Table 4.10. Significant Performance Factors at the 95% Confidence Level

| Question Number | Performance Factor | Rank Order |
|---|---|---|
| 46 | Number of purchase requests over 120 days | 1 |
| 45 | Number of purchase requests over 90 days | 2 |
| 15 | Number of contracts behind schedule | 3 |
| 44 | Percent of time BCAS is available to users | 4 |
| 37 | Number of man-hours expended to support deployments, etc. | 5 |
| 35 | Number of amendments due to contracting error | 6 |
| 62 | Total number of line items received all priorities | 7 |
| 90 | Total number of active service contracts | 8 |
| 88 | Total number of active contracts | 9 |
| 36 | Number of customer education classes provided | 10 |
| 22 | Number of protests successfully defended | 11 |
| 61 | Total number of line items received priority 1-8 | 12 |
| 89 | Total number of active A&E and construction contracts | 13 |
| 91 | Total number of commodities contracts | 14 |

Table 4.10. Continued

| Question Number | Performance Factor | Rank Order |
|---|---|---|
| 39 | Number of in-house proficiency training sessions | 15 |
| 10 | Number of open purchase requests | 16 |
| 16 | Total number of delinquent contractors | 17 |
| 30 | Number of interest payments paid due to late processing of contractor invoice | 18 |
| 26 | Total number of contracting actions | 19 |
| 24 | Percentage of competitive actions | 20 |
| 65 | Total number of modifications | 21 |
| 47 | Number of vendor follow-ups due to late delivery | 22 |
| N/A | Customer support and satisfaction | * |

* based on input from write-in response

The 23 factors found in Table 4.10 provide for a list of performance factors that can be considered for investigative question three.

Analysis of Investigative Question Number Three

Investigative question number three reads:

**3. Can a benchmark be established for each significant performance factor?**

Despite the fact that a list of 23 factors were considered statistically significant, benchmarks could not be established for all of them. In order for benchmarking to be adequately developed the specific factors should possess measures that are readily available. Working with this constraint, the authors made the determination that in order for a factor to be considered for the proposed benchmark performance measure, the factor must meet one of two criteria. First, the factor must be currently tracked and measured by the monthly BCAS report prepared at each

operational base, thus providing a current data source for the benchmarking methodology. Second, if the selected performance factor is not currently measured by BCAS, then the factor must have an available data source that can be used for the purpose of benchmarking. Appendix F lists those factors that are considered significant, yet are not currently measured. In Chapter V, under future recommendations, this area will be discussed more thoroughly.

Utilizing the two steps discussed above, the previous list of 23 significant factors was reduced to a final list of 10. Table 4.11 contains the list of factors that will be used for the benchmarking methodology in appropriate rank order as determined by the mean level of importance.

Table 4.11. Rank Order of Performance Factors Considered for Benchmarking

| Performance factor | Survey Question Number | Mean Level of Importance | Rank order |
|---|---|---|---|
| Number of contracts behind schedule | 15 | 4.503 | 1 |
| Total number of line items received all priorities | 62 | 4.37 | 2 |
| Total number of active service contracts | 90 | 4.366 | 3 |
| Total number of active contracts | 88 | 4.359 | 4 |

Table 4.11. Continued

| | | | |
|---|---|---|---|
| Total number of line items received priority 1-8 | 61 | 4.307 | 5 |
| Total number of active A&E and construction contracts | 89 | 4.275 | 6 |
| Total number of commodities contracts | 91 | 4.248 | 7 |
| Total number of contracting actions | 26 | 4.163 | 8 |
| Percentage of competitive actions | 24 | 4.144 | 9 |
| Total number of modifications | 65 | 4.137 | 10 |

Analysis of Investigative Question Number Four

In order to utilize benchmarking techniques as a means to measure performance, investigative question number four must be analyzed and discussed. Investigative question number four reads:

**4. Can a viable performance evaluation system, capable of accurately measuring overall effectiveness for a typical contracting squadron, be developed using benchmarking techniques and concepts?**

As discussed in Chapter II, benchmarking offers a comparative analysis among similar organizations so that an organizational manager is able to assess the relative effectiveness of the organization. Additionally, benchmarking identifies those organizations that are best-in-class allowing other organizations to assess and analyze

those specific characteristics that led them to achieve this success. Before this comparative analysis can take place, the raw data must be collected to determine the range for each category that is to be benchmarked.

Tables 4.12 through 4.21 contain benchmarks for the 10 performance factors identified in Table 4.11. The tables contain the benchmark as calculated from data found in the BCAS data report dated 1 October 1992 for operational contracting squadrons within ACC. As of 1 October 1992, 37 operational contracting squadrons existed within ACC, and therefore, all of the data gathered from the BCAS report for each of these squadrons was used for the purpose of benchmarking. Summaries of the gathered data are broken down into four different categories labeled total, average, minimum, and maximum. Presentation of the raw data for each of the 10 performance factors and all of the ACC squadrons can be seen in Appendix G.

Table 4.12 pertains to question number 15--number of contracts behind schedule. The benchmarking summary for this factor is shown below.

Table 4.12. Analysis of Question 15

| | |
|---|---|
| Total | 849 |
| Average | 22.95 |
| Minimum | 0 |
| Maximum | 205 |

Table 4.13 covers question number 62--total number of line items received all priorities. The benchmarking summary for this factor is shown below.

Table 4.13. Analysis of Question 62

| | |
|---|---|
| Total | 726,271 |
| Average | 19,628.95 |
| Minimum | 1,005 |
| Maximum | 44,796 |

Table 4.14 refers to survey question number 90--total number of active service contracts. The summary for this performance factor is shown below.

Table 4.14. Analysis of Question 90

| | |
|---|---|
| Total | 2,381 |
| Average | 64.35 |
| Minimum | 13 |
| Maximum | 159 |

Table 4.15 covers question number 88 on the survey--total number of active contracts. The figures for this performance factor are shown below.

Table 4.15. Analysis of Question 88

| | |
|---|---|
| Total | 5,401 |
| Average | 145.97 |
| Minimum | 22 |
| Maximum | 442 |

Table 4.16 pertains to question number 61--total number of line items received priority 1-8. The results of this performance factor are shown below.

Table 4.16. Analysis of Question 61

| | |
|---|---|
| Total | 193,403 |
| Average | 5,227.11 |
| Minimum | 0 |
| Maximum | 16,053 |

Table 4.17 refers to survey question number 89--total number of active A&E and construction contracts. The figures for this performance factor are shown below.

Table 4.17. Analysis of Question 89

| | |
|---|---|
| Total | 2,161 |
| Average | 58.41 |
| Minimum | 0 |
| Maximum | 210 |

Table 4.18 covers question number 91 on the survey--total number of commodities contracts. The benchmarking summary for this performance factor is shown below.

Table 4.18. Analysis of Question 91

| | |
|---|---|
| Total | 715 |
| Average | 19.32 |
| Minimum | 1 |
| Maximum | 72 |

Table 4.19 refers to question number 26 on the survey--total number of contracting actions. The figures for this performance factor are shown below.

Table 4.19. Analysis of Question 26

| | |
|---|---|
| Total | 1,060,231 |
| Average | 28,654.89 |
| Minimum | 1,875 |
| Maximum | 92,658 |

Table 4.20 covers survey question number 24--percentage of competitive actions. Results of this category are shown below.

Table 4.20. Analysis of Question 24

| | |
|---|---|
| Total | N/A |
| Average | 97.67% |
| Minimum | 69.80% |
| Maximum | 100% |

Table 4.21 pertains to question number 65--total number of modifications The results for this performance factor are shown below.

Table 4.21. Analysis of Question 65

| | |
|---|---|
| Total | 19,969 |
| Average | 1,350.51 |
| Minimum | 492 |
| Maximum | 3,510 |

The 10 benchmarks provided in tables 4.12 through 4.21 present data that can be used by a senior management element of a contracting squadron to gauge performance. The benchmarks provide data for the 10 most significant

performance factors as rated by the survey respondents that are currently measured in BCAS reports. These benchmark summaries provide feedback for an organization and permit an organization to compare their current performance against the performance of superior contracting squadrons within ACC. For instance, survey question number 15 pertains to the total number of contracts behind schedule. For this category the number of contracts behind schedule range from 0 to 205, with an average of 22.95. Using this performance factor as a means in which to evaluate performance would indicate that in order for an organization to achieve ACC best standards, a contracting squadron must have 0 contracts behind schedule. In order to effectively incorporate benchmarking, if a particular squadron was not operating effectively in this area, the squadron would then attempt to incorporate the methods employed by the squadron operating most effectively.

Summary

The purpose of this chapter was to present the findings obtained from data analysis performed as part of this research effort. The authors began the chapter by presenting the survey response rate followed by a discussion of population demographics. Receiving a response rate of 59.3 percent along with evenly distributed responses among the officer, civilian, and enlisted respondents adds to the

validity of the research analysis. Furthermore, the respondents appear to have the applicable knowledge to answer the survey questions since the average respondent has 15.10 years in contracting followed by 35.78 months in his or her present position. In addition, this section of the chapter covered the opinion questions and responses received from the survey respondents. The findings for this section of the chapter indicate that the average respondent is not satisfied with the current IG inspection system, and would be interested in having an alternative system developed.

Finally, the majority of the chapter focused on analysis of investigative questions one through four in an attempt to present an alternative performance evaluation system using benchmarking techniques. The findings for the first investigative question indicate that potentially 88 performance factors exist that may be capable of measuring performance for a contracting squadron. The 88 performance factors are comprised of the 63 performance factors included on the survey, and 25 write-in responses.

Findings for the second investigative question include the rank order for the 63 performance factors indicating order of importance for each of the factors. The rank order was determined by calculating the mean responses for each of the factors. Determining which factors were significant involved a large sample, one-tail z-test at the 95 percent confidence interval, with the results indicating 22 factors

to be significantly different, and one factor included as the result of write-in responses.

The third investigative question involved determining which performance factors met the benchmarking criteria of measurable, available, and important. Ten performance factors met this criteria and formed the basis for a performance evaluation system based upon benchmarking principles.

The final investigative question involved the calculation of benchmarks for each of the 10 significant factors in an effort to develop an alternative evaluation system. Using the benchmarking steps discussed in Chapter II, and the data collected from the BCAS report, benchmarks for these 10 performance factors were calculated and provided in tables 4.12 through 4.21. These benchmarks can then be used by the senior management element of a contracting squadron to gauge performance and provide feedback for the organization.

# V. Conclusions and Recommendations

## Overview

This chapter presents the conclusions drawn from the analysis of the investigative questions and addresses the overall research objective. Limitations to this research effort as well as recommendations for future efforts are also provided.

## Specific Conclusions

The purpose of this thesis effort was to present an alternative performance evaluation system capable of measuring performance within a typical operational contracting squadron. To assess organizational performance, an effective performance evaluation system must be available, and it should be established based upon valid and reliable performance measures. Furthermore, these measures should be considered important by the individuals developing the performance evaluation system, and the system should be established by the individuals whose performance will be evaluated by the system. Finally, this system should be tapered to the environment in which it is to be used. Specific conclusions from this research effort are discussed below:

1. The current system of evaluation used to assess contracting squadron performance is based upon traditional measures and is lacking certain criteria identified as

essential for an effective performance evaluation system. An alternative evaluation system should be developed for assessment of operational contracting squadrons. Benchmarking techniques can be applied in the development of this system as a capable means of measuring squadron performance.

2. Based on a review of current literature, interviews, and feedback from the survey instrument, 88 performance factors, capable of measuring organizational performance, exist within a typical contracting squadron. Of these, 24 were considered statistically significant and analyzed for benchmarking analysis. Potential candidates for benchmarking are those factors that are: (1) measurable, (2) have data readily available, and (3) provide useful information to the organizational management. Applying this criteria to the list of 24 factors, benchmarks were provided for 10 of the factors.

3. Many of the factors currently used by the Air Force to measure performance were not considered significant by the survey respondents for measuring performance. Among those factors were IG ratings, receipt of Outstanding Unit Citation, and squadron awards received from MAJCOM and higher agencies.

4. Benchmarking can be considered useful in the development of an alternative performance evaluation system. It provides information on how a particular organization is

performing with respect to similar organizations, along with identifying those organizations that are considered best-in-class. Providing this feedback allows an organizational manager to study best-in-class practices and implement those procedures in an effort to improve performance. Finally, benchmarking provides an objective and viable means of evaluating performance in a changing environment.

## Limitations

Several different and specific limitations exist in the overall research effort. These limitations should not negate the results of the study but should be considered by researchers contemplating follow-on research.

1. The list of 88 performance factors may not be all-inclusive for measuring performance within an operational contracting squadron. Since 35 write-in responses were added to the survey, the indication is that further performance factors may exist within a squadron.

2. Only 10 out of the 24 significant factors could be considered for the purpose of benchmarking due to data availability. The remaining 14 factors listed in Appendix F should be considered for benchmarking analysis. To accomplish this, a method to track and gather data must be established.

3. Despite the statistical significance of the 10 performance factors that were used for the benchmarking

analysis, not all of these factors appear capable of accurately measuring performance within a contracting squadron. In order to provide more useful measures for a contracting squadron, ratios should be developed for the significant factors.

4. This study was concerned with CONUS contracting squadrons only, therefore the results cannot be assumed to be valid for overseas contracting squadrons.

5. The benchmarks established during this study are only as accurate as the BCAS data used to establish them.

Recommendations

Specific recommendations offered for consideration as a result of this study are as follows.

1. The Air Force contracting community should determine a definitive list of performance factors that are important and can be used in the development of an alternative performance evaluation system. The relative importance of each performance factor should be analyzed and compared by command to determine if significant differences exist. Differences should be identified and reconciled prior to establishing an alternative performance evaluation system.

2. Periodic reviews for each performance factor should be conducted. Additionally, established benchmarks should be continuously reviewed and recalibrated as necessary.

3. Implementation of benchmarking techniques should be internalized by senior management throughout the Air Force contracting community.

Specific recommendations for future research include the following.

1. Continue development of an alternative performance evaluation system that utilizes benchmarking techniques and incorporates those characteristics needed to evaluate performance in a total quality environment. The selected system should enable a squadron commander to strictly focus on the mission of the squadron, whereby the performance evaluation system would provide an objective measure of mission accomplishment.

1. Establish ratios for all benchmarks so that the benchmarks can be used as a standardized measure of performance.

2. Establish a method to measure those factors found significant but not currently tracked by BCAS or other sources. Benchmarks could then be established for these factors, thereby providing squadron commanders a more in-depth system to evaluate contracting squadron performance.

## Appendix A: Colonel Cordano's Letter

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR COMBAT COMMAND
LANGLEY AIR FORCE BASE, VIRGINIA

HQ ACC/LGC
130 Douglas Street, Suite 210
Langley AFB VA 23665-2791

Captain Mark Fahrenkamp
AFIT/LSG
Wright Patterson AFB OH 45433

Dear Captain Fahrenkamp

As you search for a topic for your thesis, I would like to suggest an item of concern. Air Combat Command (ACC) is interested in establishing a metric or metrics to determine the effectiveness of a given contracting squadron's support to the wings' mission needs. Such a metric(s) would be beneficial not only as an assessment by ACC but also to squadron commanders as they strive to identify areas which may need process improvements.

I offer the support of the ACC/LGC staff to assist you further with problem identification or research materials. If you would like to discuss this, contact Mr Carpenter, LGCP at DSN 574-5096.

Sincerely

Robert A Cordano
ROBERT A. CORDANO, Colonel, USAF
Chief, Contracting Division

## Appendix B: Management Survey

NOTE: The survey questions used for this research are highlighted in bold print.

FROM: AFIT/LSA 29 March 1993

SUBJECT: Survey - Organizational Performance Factors in Operational Contracting Squadrons

TO: Survey Recipient

As part of two thesis efforts at the Air Force Institute of Technology (AFIT), we are attempting to develop improved management tools for operational contracting squadrons. To do this, the attached survey attempts to gather your opinions and judgments about factors significant to a contracting squadron's performance. Copies of the survey are being sent to squadron commanders, deputy base contracting officers, and contracting squadron first sergeants at all bases within the CONUS.

As a senior manager, you are in a unique position to provide a critical body of information necessary for these thesis efforts.
We estimate that completion of the survey will only take about twenty-five minutes. The opinions and judgment of experienced personnel such as you, will provide a significant contribution to the success of these studies.

The enclosed survey was pilot tested by a sample of contracting squadron personnel. Based upon the pilot test, the survey was
revised in order to obtain all necessary data while requiring a minimum of your time.

**Please mark your responses directly on the survey. No coding sheet is required. When complete, please return the completed survey in the enclosed envelope.**

Due to deadlines established by AFIT, and the fact that other phases of both research projects cannot be carried out until analysis of the survey data is complete, we would appreciate if you complete and return the subject survey by **3 May 1993.**

Your cooperation in this matter is greatly appreciated. Your input will provide great insight into how operational contracting squadrons can improve their overall performance.

MARK W. FAHRENKAMP, CAPT, USAF
AFIT Graduate Student

MARK P. GARST, CAPT, USAF
AFIT Graduate Student

DOUGLAS E. JAMES, CAPT, USAF
AFIT Graduate Student

DENNIS W. GROSECLOSE, 1LT, USAF
AFIT Graduate Student

## SURVEY

### PART I. BACKGROUND

This section of the survey obtains information about your background. The information requested is to ensure the groups you belong to are accurately represented, not to identify you as an individual. Your anonymity will be maintained throughout this study.

**1. Total months in present job position.**

_____

**2. Which of the following applies to you?**

1. Civilian
2. Officer
3. Enlisted

**3. How many years of contracting experience do you have?**

_____

**4. What major command are you presently assigned to?**

1. Air Mobility Command
2. Air Combat Command
3. Air Training Command
4. Air Force Material Command
5. Other

**5. How important is it to you that your organization achieve optimal effectiveness?**

1. Of no importance.
2. Of slight importance.
3. Moderately important.
4. Fairly important.
5. Extremely important.

**6. What was the last overall command Inspector General (IG) rating of your organization?**

1. Outstanding
2. Excellent
3. Satisfactory
4. Marginal
5. Unsatisfactory
6. Does not apply.

**7. Were you in your present job position during the last command IG inspection?**

1. Yes
2. No

Please indicate your opinions on the following two statements:

**8. The current command IG evaluation system satisfactorily measures organizational performance.**

1. Strongly disagree.
2. Disagree.
3. Neutral.
4. Agree.
5. Strongly agree.

**9. An evaluation system, different from the command IG, would be useful in measuring overall organizational performance.**

1. Strongly disagree.
2. Disagree.
3. Neutral.
4. Agree.
5. Strongly agree.

## PART II. ORGANIZATIONAL PERFORMANCE FACTORS

This portion of the survey contains factors sometimes used to measure performance of operational contracting squadrons. Please indicate the importance you would assign to each factor by circling the appropriate number on the scale printed to the right of each factor. Scale values are shown below:

**Scale of Importance**

| Definitely Not Important | Somewhat Not Important | Neutral | Somewhat Important | Definitely Important |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

| PERFORMANCE FACTOR | SCALE OF IMPORTANCE |
|---|---|
| **10. Number of open purchase requests.** | 1 2 3 4 5 |
| **11. Number of Small Business goals achieved.** | 1 2 3 4 5 |
| **12. Last IG rating.** | 1 2 3 4 5 |
| **13. Command or higher contracting awards (i.e. Best Contracting Squadron in ACC, Professionalism in Contracting, etc.)** | 1 2 3 4 5 |
| **14. Outstanding Unit Citation.** | 1 2 3 4 5 |
| **15. Number of contracts behind schedule (delinquent).** | 1 2 3 4 5 |
| **16. Total number of delinquent contractors.** | 1 2 3 4 5 |
| **17. Number of SF 129 packages mailed.** | 1 2 3 4 5 |
| **18. Number of new vendors identified and loaded in BCAS.** | 1 2 3 4 5 |
| **19. Number of Reports of Discrepancy (RODS).** | 1 2 3 4 5 |
| **20. Number of STEP promotions.** | 1 2 3 4 5 |
| **21. Number of protests received.** | 1 2 3 4 5 |

**Scale of Importance**

| Definitely Not Important | Somewhat Not Important | Neutral | Somewhat Important | Definitely Important |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

| PERFORMANCE FACTOR | SCALE OF IMPORTANCE |
|---|---|
| **22. Number of protests successfully defended.** | 1 2 3 4 5 |
| **23. Total number of ratifications.** | 1 2 3 4 5 |
| **24. Percentage of competitive actions.** | 1 2 3 4 5 |
| 25. Number of personnel assigned versus authorized. | 1 2 3 4 5 |
| **26. Total number of contracting actions.** | 1 2 3 4 5 |
| **27. Total number of centralized actions.** | 1 2 3 4 5 |
| **28. Total number of decentralized actions.** | 1 2 3 4 5 |
| **29. Total dollars awarded competitively.** | 1 2 3 4 5 |
| **30. Number of interest payments paid due to late processing of contractor invoice.** | 1 2 3 4 5 |
| **31. Number of contracts awarded using source selection.** | 1 2 3 4 5 |
| **32. Number of undefinitized actions.** | 1 2 3 4 5 |
| **33. Number of BPAs administered.** | 1 2 3 4 5 |
| 34. Number of contracting officer warrants. | 1 2 3 4 5 |
| **35. Number of solicitation amendments due to contracting personnel error.** | 1 2 3 4 5 |
| **36. Number of customer education classes/training provided.** | 1 2 3 4 5 |

**Scale of Importance**

| Definitely Not Important | Somewhat Not Important | Neutral | Somewhat Important | Definitely Important |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

| PERFORMANCE FACTOR | SCALE OF IMPORTANCE |
|---|---|
| **37. Number of man-hours expended to support deployments, contingency contracting activities, and mobility exercises.** | 1 2 3 4 5 |
| 38. The ratio of formal training quotas received divided by the number utilized. | 1 2 3 4 5 |
| **39. The number of in-house proficiency training performed.** | 1 2 3 4 5 |
| **40. Number of squadron Operating Instructions.** | 1 2 3 4 5 |
| **41. Number of self inspections conducted.** | 1 2 3 4 5 |
| **42. Number of Value Engineering Change Proposals received.** | 1 2 3 4 5 |
| **43. Number of Value Engineering Change Proposals approved.** | 1 2 3 4 5 |
| **44. Percent of the time BCAS is available to users.** | 1 2 3 4 5 |
| **45. Number of Purchase Requests over 90 days old.** | 1 2 3 4 5 |
| **46. Number of Purchase Requests over 120 days old.** | 1 2 3 4 5 |
| **47. Number of vendor follow-ups due to late delivery.** | 1 2 3 4 5 |
| 48. Number of personnel qualified for at least APDP level I certification. | 1 2 3 4 5 |
| **49. Number of walk-through purchase requests.** | 1 2 3 4 5 |
| 50. The number of administrators and buyers (excluding management and procurement clerks). | 1 2 3 4 5 |
| 51. The number of clerical support personnel. | 1 2 3 4 5 |

**Scale of Importance**

| Definitely Not Important | Somewhat Not Important | Neutral | Somewhat Important | Definitely Important |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

| PERFORMANCE FACTOR | SCALE OF IMPORTANCE |
|---|---|
| 52. The number of management personnel (includes front office branch or flight chiefs, and Executive Officer/NCO). | 1 2 3 4 5 |
| 53. The number of assigned civilian personnel. | 1 2 3 4 5 |
| 54. The number of assigned officer personnel. | 1 2 3 4 5 |
| 55. The number of assigned enlisted personnel. | 1 2 3 4 5 |
| 56. The total office experience level. | 1 2 3 4 5 |
| 57. The average office experience level (total experience divided by total number of personnel). | 1 2 3 4 5 |
| 58. The total office experience level without procurement clerk or administrative support. | 1 2 3 4 5 |
| 59. The average office experience level without procurement clerk or administrative support. | 1 2 3 4 5 |
| 60. The total office operating budget (money you have to operate the office). | 1 2 3 4 5 |
| **61. The total number of line items received priority 1-8.** | 1 2 3 4 5 |
| **62. The total number of line items received (all priorities).** | 1 2 3 4 5 |
| **63. The number of different customer organizations served by our office.** | 1 2 3 4 5 |
| **64. The total dollars awarded.** | 1 2 3 4 5 |

**Scale of Importance**

| Definitely Not Important | Somewhat Not Important | Neutral | Somewhat Important | Definitely Important |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

| PERFORMANCE FACTOR | SCALE OF IMPORTANCE |
|---|---|
| **65. The total number of modifications executed.** | 1 2 3 4 5 |
| **66. The priority 1-3 CALT.** | 1 2 3 4 5 |
| **67. The priority 4-8 CALT.** | 1 2 3 4 5 |
| **68. The priority 9-15 CALT.** | 1 2 3 4 5 |
| **69. The overall (average) CALT.** | 1 2 3 4 5 |
| **70. The total number of Non-Appropriated Fund actions.** | 1 2 3 4 5 |
| **71. The total Non-Appropriated Fund dollars awarded.** | 1 2 3 4 5 |
| **72. The total number of Section 8A actions.** | 1 2 3 4 5 |
| **73. The total Section 8A dollars awarded.** | 1 2 3 4 5 |
| **74. The total number of line items awarded.** | 1 2 3 4 5 |
| **75. The total number of centralized line items awarded.** | 1 2 3 4 5 |
| **76. The total number of decentralized line items awarded.** | 1 2 3 4 5 |
| **77. The total centralized dollars awarded.** | 1 2 3 4 5 |
| **78. The total decentralized dollars awarded.** | 1 2 3 4 5 |
| 79. The ratio of centralized actions divided by centralized line items (measure of combining multiple line items into one action). | 1 2 3 4 5 |

**Scale of Importance**

| Definitely Not Important | Somewhat Not Important | Neutral | Somewhat Important | Definitely Important |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

| PERFORMANCE FACTOR | SCALE OF IMPORTANCE |
|---|---|
| 80. The ratio of decentralized dollars awarded divided by total dollars awarded (measure of decentralizing workload). | 1 2 3 4 5 |
| 81. The ratio of decentralized line items awarded divided by total line items awarded (measure of decentralizing workload). | 1 2 3 4 5 |
| Note for question 82: The following ratio gives a percentage of in-house awards which required modification (a low percentage is good). | |
| 82. The ratio of total modifications executed divided by total centralized actions awarded. | 1 2 3 4 5 |
| **83. The total set-aside actions awarded.** | 1 2 3 4 5 |
| **84. The total number of large business actions awarded that were available for small business (a measure of dissolving set-asides).** | 1 2 3 4 5 |
| **85. The total large business dollars awarded that were available for small business.** | 1 2 3 4 5 |
| **86. The ratio of small business dollars awarded divided by total dollars available for small business.** | 1 2 3 4 5 |
| **87. The percent competitive dollars measure (competitive dollars divided by total dollars awarded).** | 1 2 3 4 5 |
| **88. The total number of active contracts administered.** | 1 2 3 4 5 |
| **89. The total number of active A&E and construction contracts administered.** | 1 2 3 4 5 |

**Scale of Importance**

| Definitely Not Important | Somewhat Not Important | Neutral | Somewhat Important | Definitely Important |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

| PERFORMANCE FACTOR | SCALE OF IMPORTANCE |
|---|---|
| **90. The total number of active service contracts administered.** | 1 2 3 4 5 |
| **91. The total number of active commodities contracts administered.** | 1 2 3 4 5 |

Note for question 92: Priced actions represent actions that were purchased from such pre-priced instruments as calls against blanket delivery orders or blanket purchase agreements and delivery orders against pre-priced contracts. Unpriced actions are those actions which required pricing action prior to award. This includes items such as purchase orders, centralized BPAs, imprest fund actions and contracts.

| | |
|---|---|
| 92. The ratio of priced actions awarded divided by unpriced actions. | 1 2 3 4 5 |

**PART III: ADDITIONAL PERFORMANCE FACTORS**

Please add any additional factors you have used to evaluate contracting performance and indicate the importance of each.

| | |
|---|---|
| 93. _____ | 1 2 3 4 5 |
| 94. _____ | 1 2 3 4 5 |
| 95. _____ | 1 2 3 4 5 |
| 96. _____ | 1 2 3 4 5 |
| 97. _____ | 1 2 3 4 5 |

## PART IV. OVERALL PERFORMANCE

Using the factors listed above, including the factors you may have added in questions 93-97, select the five you feel are the most important in defining organizational performance within an operational contracting squadron. Indicate your ranking of these five factors by inserting their question number in the blanks below.

| _____ | _____ | _____ | _____ | _____ |
|---|---|---|---|---|
| FIRST in Importance | SECOND in Importance | THIRD in Importance | FOURTH in Importance | FIFTH in Importance |

## PART V. OVERALL PERFORMANCE OF YOUR SQUADRON/ORGANIZATION

Based upon the following scale, how would you rank the overall performance of the contracting squadron/organization you are assigned. This question is based solely on your belief, not the last IG rating or command evaluation. Please circle the appropriate level of performance.

Unsatisfactory Marginal Satisfactory Excellent Outstanding

## PART VI. DESIRABLE CHARACTERISTICS OF A PERFORMANCE EVALUATION AND FEEDBACK SYSTEM

This part of the survey is designed to obtain managers views and desires concerning a performance evaluation and feedback system for operational contracting. In addition, this section contains questions concerning current methods of evaluating and providing feedback to the operational contracting squadron. Please indicate the importance you would assign to the statements listed below. Continue using the following scale.

**Scale of Importance**

| Definitely Not Important | Somewhat Not Important | Neutral | Somewhat Important | Definitely Important |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

| PERFORMANCE FACTOR | SCALE OF IMPORTANCE |
|---|---|
| 98. The current IG method of performance evaluation provides feedback to help improve performance which is: | 1 2 3 4 5 |
| 99. Current command and Air Force awards provide feedback concerning performance which is: | 1 2 3 4 5 |
| 100. Improving operational contracting squadron productivity and efficiency is a goal which is: | 1 2 3 4 5 |
| 101. A contracting evaluation system which simultaneously evaluates several inputs and outputs to the process (as opposed to single measures such as CALT), is a tool which is: | 1 2 3 4 5 |
| 102. A contracting evaluation system which compares all operational contracting squadrons while taking into account differences in squadron characteristics (such as manning, experience, and workload) is a tool which is: | 1 2 3 4 5 |
| 103. A contracting evaluation system which does not rely solely upon measures which the chain of command (LG, Wing CC) find important, is a tool which is: | 1 2 3 4 5 |

**Scale of Importance**

| Definitely Not Important | Somewhat Not Important | Neutral | Somewhat Important | Definitely Important |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

| PERFORMANCE FACTOR | SCALE OF IMPORTANCE |
|---|---|
| 104. An evaluation system which compares squadrons relative to other contracting squadrons, is a tool which is: | 1 2 3 4 5 |
| 105. A contracting evaluation system which compares contracting squadrons to the best performers as opposed to the average, is a tool which is: | 1 2 3 4 5 |
| 106. A contracting evaluation system which provides managers with timely feedback, including exact data on resource utilization and relative efficiencies compared with other squadrons, is a tool which is: | 1 2 3 4 5 |

## PART VII. ADDITIONAL COMMENTS ON CONTRACTING PERFORMANCE

Using the space provided below, please feel free to add any additional comments you may have concerning the performance of operational contracting squadrons.

## Appendix C: Surveyed Bases

Andrews AFB
Minot AFB
Eglin AFB
Hill AFB
Barksdale AFB
Carswell AFB
Dyess AFB
Ellsworth AFB
Columbus AFS
Cannon AFB
Altus AFB
Little Rock AFB
KI Sawyer AFB
Griffiss AFB
Goodfellow AFB
Laughlin AFB
Grissom AFB
Fairchild AFB
Malmstrom AFB
March AFB
McGuire AFB
Moody AFB
Offutt AFB*
Charleston AFB
Sheppard AFB
Reese AFB
Plattsburgh AFB
Travis AFB
Scott AFB
Los Angeles AFB
Nellis AFB
Pope AFB
Onizuka AFB
Whiteman AFB
Vandenberg AFB
Edwards AFB
Kelly AFB
Bolling AFB
Robbins AFB
Shaw AFB
USAF Academy
Gunter AFB

McConnel AFB
Mountain Home AFB
Hanscom AFB
Hurlburt Field
Bergstrom AFB
Davis-Monthan AFB
F.E. Warren AFB
Dover AFB
Castle AFB
Beale AFB
Lowry AFB
Langley AFB*
Holloman AFB
Lackland AFB
Loring AFB
Keesler AFB
Grand Forks AFB
Luke AFB
MacDill AFB
Maxwell AFB
McCord AFB
Norton AFB
Falcon AFS
Tyndall AFB
Seymour Johnson AFB
Randolph AFB
Patrick AFB
Shaw AFB
Langley AFB*
McClellan AFB
Newark AFS
Peterson AFB
Wurtsmith AFB
Williams AFB
Wright Patterson AFB
Brooks AFB
Kirtland AFB
Arnold AFS
Scott AFB
Tinker AFB
Vance AFB

* This represents a base with two contracting squadrons.

## Appendix D: Performance Factors by Command

| Performance factor | ACC | AMC | AFMC | ATC | Other | Total Avg | Staff |
|---|---|---|---|---|---|---|---|
| Number of purchase requests over 120 days (46) | 4.69 | 4.72 | 4.62 | 4.74 | 4.73 | 4.699 | 4.54 |
| Number of purchase requests over 90 days (45) | 4.57 | 4.52 | 4.54 | 4.65 | 4.2 | 4.536 | 4.46 |
| Number of contracts behind schedule (15) | 4.39 | 4.52 | 4.77 | 4.65 | 4.6 | 4.503 | 4 |
| Percent of time BCAS is available to users (44) | 4.55 | 4.32 | 4.46 | 4.39 | 4.6 | 4.484 | 4.31 |
| Number of man-hours expended to support deployments, etc. (37) | 4.52 | 4.48 | 4.39 | 4.52 | 4 | 4.451 | 4.31 |
| Number of amendments due to contracting error (35) | 4.47 | 4.44 | 4.54 | 4.22 | 4.33 | 4.418 | 4.23 |
| Total number of line items received all priorities (62) | 4.43 | 4.16 | 4.69 | 4.65 | 3.73 | 4.373 | 4.23 |
| Total number of active service contracts (90) | 4.32 | 4.24 | 4.38 | 4.61 | 4.4 | 4.366 | 4 |

| Performance factor | ACC | AMC | AFMC | ATC | Other | Total Avg | Staff |
|---|---|---|---|---|---|---|---|
| Total number of active contracts (88) | 4.31 | 4.2 | 4.38 | 4.43 | 4.4 | 4.359 | 4.15 |
| Number of customer education classes provided (36) | 4.32 | 4.24 | 4.38 | 4.30 | 4.4 | 4.317 | 4 |
| Number of protests successfully defended (22) | 4.18 | 4.36 | 4.31 | 4.52 | 4.53 | 4.307 | 3.77 |
| Total number of line items received priority 1-8 (61) | 4.31 | 4 | 4.77 | 4.57 | 4 | 4.307 | 4.31 |
| Total number of active A&E and construction contracts (89) | 4.25 | 4.16 | 4.46 | 4.52 | 4.07 | 4.275 | 4 |
| Total number of commodities contracts (91) | 4.25 | 4.08 | 4.38 | 4.57 | 3.93 | 4.248 | 3.85 |
| Number of in-house proficiency training sessions (39) | 4.21 | 4.08 | 4.31 | 4.35 | 4.27 | 4.222 | 3.92 |
| Number of open purchase requests (10) | 4.29 | 4.08 | 4.23 | 4.17 | 3.87 | 4.190 | 3.85 |
| Total number of delinquent contractors (16) | 4.13 | 4.32 | 4.31 | 4.17 | 4.2 | 4.190 | 3.92 |

| Performance factor | ACC | AMC | AFMC | ATC | Other | Total Avg | Staff |
|---|---|---|---|---|---|---|---|
| Number of interest payments paid due to late processing of contractor invoice (30) | 4.17 | 4.12 | 4.54 | 4.09 | 4.13 | 4.176 | 3.85 |
| Total number of contracting actions (26) | 4.13 | 4.08 | 4.31 | 4.43 | 3.93 | 4.163 | 3.54 |
| Percentage of competitive actions (24) | 4.10 | 4.16 | 4 | 4.09 | 4.53 | 4.144 | 4.08 |
| Total number of modifications (65) | 4.12 | 4.32 | 4.46 | 4.04 | 3.8 | 4.137 | 4 |
| Number of vendor follow-ups due to late delivery (47) | 4.05 | 4.24 | 4.62 | 4.04 | 4 | 4.124 | 4.15 |
| Total dollars awarded competitively (29) | 4.03 | 4.08 | 3.77 | 4.22 | 4.2 | 4.059 | 4 |
| Number of different customer organizations served by contracting (63) | 4 | 3.92 | 4.31 | 4.48 | 3.53 | 4.039 | 3.54 |
| Total number of ratifications (23) | 4.13 | 3.84 | 3.85 | 4.04 | 3.93 | 4.026 | 3.85 |
| Priority 1-3 CALT (66) | 4.03 | 3.8 | 4.31 | 4.13 | 3 87 | 4.013 | 3.92 |
| Total number of line items awarded (74) | 4.04 | 4.08 | 4 | 4.39 | 3.2 | 4.013 | 4.23 |
| Total number of centralized actions (27) | 3.97 | 4.04 | 4.15 | 4.17 | 3.73 | 4.007 | 3.38 |

| Performance factor | ACC | AMC | AFMC | ATC | Other | Total Avg | Staff |
|---|---|---|---|---|---|---|---|
| Total number of centralized line items awarded (75) | 4 | 4.04 | 4.15 | 4.26 | 3.2 | 3.980 | 3.62 |
| Number of walk-through purchase requests (49) | 3.81 | 4.2 | 4.46 | 4.13 | 3.6 | 3.980 | 4.08 |
| Percentage competitive dollars measure (87) | 3.92 | 3.96 | 3.69 | 4.13 | 4.07 | 3.954 | 3.62 |
| Priority 4-8 CALT (67) | 3.95 | 3.76 | 4.31 | 4.09 | 3.6 | 3.935 | 3.85 |
| Total number of large business actions awarded that were available for small business (84) | 3.87 | 4.04 | 3.54 | 4.22 | 3.93 | 3.928 | 3.31 |
| Number of self inspections conducted (41) | 3.84 | 3.84 | 4.15 | 4.13 | 3.6 | 3.889 | 3.85 |
| Total large business dollars awarded that were available for small business (85) | 3.90 | 3.88 | 3.46 | 4.22 | 3.67 | 3.882 | 3.31 |
| Number of Reports of Discrepancy (19) | 3.88 | 3.92 | 4.23 | 3.61 | 3.8 | 3.869 | 3.38 |
| The overall (average) CALT (69) | 3.91 | 3.76 | 4.08 | 4 | 3.47 | 3.869 | 3.85 |
| The priority 9-15 CALT (68) | 3.82 | 3.68 | 4.23 | 4.09 | 3.4 | 3.830 | 3.69 |

| Performance factor | ACC | AMC | AFMC | ATC | Other | Total Avg | Staff |
|---|---|---|---|---|---|---|---|
| Number of protests received (21) | 3.86 | 3.92 | 3.92 | 3.57 | 3.73 | 3.817 | 3.62 |
| Number of undefinitized actions (32) | 3.83 | 3.54 | 4.15 | 3.96 | 3.67 | 3.814 | 3.38 |
| Total Section 8A dollars awarded (73) | 3.79 | 3.76 | 3.69 | 3.96 | 3.53 | 3.778 | 3.62 |
| Total set-aside actions awarded (83) | 3.79 | 3.84 | 3.77 | 4.04 | 3.13 | 3.771 | 3.38 |
| Ratio of small business dollars awarded divided by total dollars available for small business (86) | 3.81 | 3.88 | 3.69 | 3.74 | 3.53 | 3.771 | 3.23 |
| Total number of decentralized actions (28) | 3.71 | 4 | 3.69 | 3.93 | 3.47 | 3.768 | 3.23 |
| Total centralized dollars awarded (77) | 3.77 | 3.92 | 3.69 | 4 | 3.2 | 3.765 | 3.31 |
| Number of small business goals achieved (11) | 3.78 | 3.56 | 3.54 | 4 | 3.8 | 3.758 | 3.77 |
| Total dollars awarded (64) | 3.78 | 3.68 | 3.62 | 4.13 | 3.33 | 3.758 | 3.62 |
| Total number of Section 8A actions (72) | 3.75 | 3.8 | 3.69 | 3.87 | 3.6 | 3.758 | 3.69 |
| Number of BPAs administered (33) | 3.58 | 3.72 | 3.92 | 3.70 | 3.47 | 3.641 | 3.31 |
| Total number of decentralized line items awarded (76) | 3.58 | 3.88 | 3.62 | 3.91 | 2.8 | 3.608 | 3.31 |

| Performance factor | ACC | AMC | AFMC | ATC | Other | Total Avg | Staff |
|---|---|---|---|---|---|---|---|
| Outstanding Unit Citation (14) | 3.66 | 3.2 | 3.62 | 3.39 | 3.13 | 3.490 | 3.08 |
| Total decentralized dollars awarded (78) | 3.48 | 3.72 | 3.31 | 3.78 | 2.73 | 3.477 | 3.08 |
| Number of contracts awarded using source selection (31) | 3.38 | 3.4 | 4 | 3.30 | 3.47 | 3.431 | 3.31 |
| Command or higher contracting awards (13) | 3.53 | 3.2 | 3.92 | 3.17 | 3.07 | 3.408 | 3.08 |
| Last IG rating (12) | 3.51 | 3.36 | 3 | 3.22 | 3 | 3.350 | 3 |
| Number of STEP promotions (20) | 3.06 | 3.2 | 3.54 | 2.96 | 3 | 3.105 | 2.77 |
| Total number of Non-Appropriated Fund actions (70) | 2.95 | 3.1 | 3.23 | 2.96 | 2.53 | 2.958 | 2.92 |
| Total Non-Appropriated Fund dollars awarded (71) | 2.88 | 3.06 | 3.23 | 3 | 2.73 | 2.944 | 3 |
| Number of Value Engineering Change Proposals approved (43) | 2.86 | 3 | 3.08 | 2.78 | 2.73 | 2.876 | 2.46 |
| Number of new vendors identified and loaded in BCAS (18) | 2.91 | 2.72 | 3.23 | 2.65 | 2.47 | 2.824 | 3 |
| Number of squadron Operating Instructions (40) | 2.90 | 2.64 | 3 | 2.87 | 2.27 | 2.797 | 2.69 |

| Performance factor | ACC | AMC | AFMC | ATC | Other | Total Avg | Staff |
|---|---|---|---|---|---|---|---|
| Number of Value Engineering Change Proposals received (42) | 2.78 | 2.84 | 3 | 2.65 | 2.73 | 2.784 | 2.46 |
| Number of SF 129 packages mailed (17) | 2.69 | 2.6 | 2.85 | 2.39 | 2.27 | 2.601 | 2.23 |

# Appendix E: Z-Test Results

| Question # | 46 | 45 | 15 | 44 | 37 | 35 | 62 |
|---|---|---|---|---|---|---|---|
| Total | 719 | 694 | 689 | 686 | 681 | 676 | 669 |
| Mean | 4.699346 | 4.535943 | 4.503268 | 4.48366 | 4.45098 | 4.418301 | 4.372549 |
| Variance | 0.290592 | 0.381923 | 0.580581 | 0.396113 | 0.565015 | 0.573873 | 0.630031 |
| Std Dev | 0.539066 | 0.617999 | 0.761959 | 0.629375 | 0.751675 | 0.757544 | 0.793745 |
| | | | | | | | |
| Numerator | 0.699346 | 0.535948 | 0.503268 | 0.48366 | 0.45098 | 0.418301 | 0.372549 |
| Denominator | 0.043581 | 0.049962 | 0.061601 | 0.050882 | 0.060769 | 0.061244 | 0.06417 |
| Test Stat | 16.0471 | 10.72705 | 8.169838 | 9.505535 | 7.421184 | 6.830087 | 5.805614 |
| | | | | | | | |
| One tail | | | | | | | |
| | | | | | | | |
| 99%test | 2.326 | 2.326 | 2.326 | 2.326 | 2.326 | 2.326 | 2.326 |
| | | | | | | | |
| 95%test | 1.645 | 1.645 | 1.645 | 1.645 | 1.645 | 1.645 | 1.645 |
| | | | | | | | |
| 90%test | 1.282 | 1.282 | 1.282 | 1.282 | 1.282 | 1.282 | 1.282 |
| | | | | | | | |
| 99% test | REJECT | REJECT | REJECT | REJECT | REJECT | REJECT | REJECT |
| | | | | | | | |
| 95% test | REJECT | REJECT | REJECT | REJECT | REJECT | REJECT | REJECT |
| | | | | | | | |
| 90% test | REJECT | REJECT | REJECT | REJECT | REJECT | REJECT | REJECT |

| Question # | 90 | 88 | 36 | 22 | 61 | 89 | 91 |
|---|---|---|---|---|---|---|---|
| Total | 668 | 662.5 | 660.5 | 659 | 659 | 654 | 650 |
| Mean | 4.366013 | 4.358553 | 4.316993 | 4.30719 | 4.30719 | 4.27451 | 4.248366 |
| ariance | 0.812521 | 0.772907 | 0.571551 | 0.872119 | 0.714224 | 0.871517 | 0.845803 |
| Std Dev | 0.9014 | 0.879151 | 0.75601 | 0.933873 | 0.845118 | 0.933551 | 0.919676 |
| | | | | | | | |
| Numerator | 0.366013 | 0.358553 | 0.316993 | 0.30719 | 0.30719 | 0.27451 | 0.248366 |
| Denominator | 0.072874 | 0.071075 | 0.06112 | 0.075499 | 0.068324 | 0.075473 | 0.074351 |
| Test Stat | 5.022557 | 5.044698 | 5.186428 | 4.068781 | 4.496088 | 3.637187 | 3.340436 |
| | | | | | | | |
| One tail | | | | | | | |
| | | | | | | | |
| 99%test | 2.326 | 2.326 | 2.326 | 2.326 | 2.326 | 2.326 | 2.326 |
| | | | | | | | |
| 95%test | 1.645 | 1.645 | 1.645 | 1.645 | 1.645 | 1.645 | 1.645 |
| | | | | | | | |
| 90%test | 1.282 | 1.282 | 1.282 | 1.282 | 1.282 | 1.282 | 1.282 |
| | | | | | | | |
| 99% test | REJECT | REJECT | REJECT | REJECT | REJECT | REJECT | REJECT |
| | | | | | | | |
| 95% test | REJECT | REJECT | REJECT | REJECT | REJECT | REJECT | REJECT |
| | | | | | | | |
| 90% test | REJECT | REJECT | REJECT | REJECT | REJECT | REJECT | REJECT |

| Question # | 39 | 10 | 16 | 30 | 28 | 24 | 65 |
|---|---|---|---|---|---|---|---|
| Total | 646 | 641 | 641 | 639 | 637 | 634 | 633 |
| Mean | 4.222222 | 4.189542 | 4.189542 | 4.176471 | 4.163399 | 4.143791 | 4.137255 |
| Variance | 0.726608 | 0.799364 | 0.75989 | 0.98839 | 0.663915 | 0.689714 | 0.671827 |
| Std Dev | 0.852413 | 0.894071 | 0.871717 | 0.994178 | 0.81481 | 0.830491 | 0.81965 |
| | | | | | | | |
| Numerator | 0.222222 | 0.189542 | 0.189542 | 0.176471 | 0.163399 | 0.143791 | 0.137255 |
| Denominator | 0.068914 | 0.072281 | 0.070474 | 0.080375 | 0.065873 | 0.067141 | 0.066265 |
| Test Stat | 3.224654 | 2.622286 | 2.689533 | 2.195603 | 2.480494 | 2.141619 | 2.071309 |
| | | | | | | | |
| One tail | | | | | | | |
| | | | | | | | |
| 99%test | 2.326 | 2.326 | 2.326 | 2.326 | 2.326 | 2.326 | 2.326 |
| | | | | | | | |
| 95%test | 1.645 | 1.645 | 1.645 | 1.645 | 1.645 | 1.645 | 1.645 |
| | | | | | | | |
| 90%test | 1.282 | 1.282 | 1.282 | 1.282 | 1.282 | 1.282 | 1.282 |
| | | | | | | | |
| 99% test | REJECT | REJECT | REJECT | FTR | REJECT | FTR | FTR |
| | | | | | | | |
| 95% test | REJECT | REJECT | REJECT | REJECT | REJECT | REJECT | REJECT |
| | | | | | | | |
| 90% test | REJECT | REJECT | REJECT | REJECT | REJECT | REJECT | REJECT |

| Question # | 47 | 29 | 63 | 23 | 66 | 74 | 27 |
|---|---|---|---|---|---|---|---|
| Total | 631 | 621 | 618 | 616 | 614 | 614 | 613 |
| Mean | 4.124183 | 4.058824 | 4.039216 | 4.026144 | 4.013072 | 4.013072 | 4.006536 |
| Variance | 0.701582 | 0.832043 | 0.880031 | 0.94668 | 1.276144 | 0.973512 | 0.677589 |
| Std Dev | 0.837605 | 0.912164 | 0.9381 | 0.972975 | 1.129685 | 0.986667 | 0.823158 |
| | | | | | | | |
| Numerator | 0.124183 | 0.058824 | 0.039216 | 0.026144 | 0.013072 | 0.013072 | 0.006536 |
| Denominator | 0.067716 | 0.073744 | 0.075841 | 0.07866 | 0.091328 | 0.079767 | 0.066548 |
| Test Stat | 1.83387 | 0.797671 | 0.517079 | 0.332363 | 0.143131 | 0.163875 | 0.098214 |
| | | | | | | | |
| One tail | | | | | | | |
| | | | | | | | |
| 99%test | 2.326 | 2.326 | 2.326 | 2.326 | 2.326 | 2.326 | 2.326 |
| | | | | | | | |
| 95%test | 1.645 | 1.645 | 1.645 | 1.645 | 1.645 | 1.645 | 1.645 |
| | | | | | | | |
| 90%test | 1.282 | 1.282 | 1.282 | 1.282 | 1.282 | 1.282 | 1.282 |
| | | | | | | | |
| 99% test | FTR | FTR | FTR | FTR | FTR | FTR | FTR |
| | | | | | | | |
| 95% test | REJECT | FTR | FTR | FTR | FTR | FTR | FTR |
| | | | | | | | |
| 90% test | REJECT | FTR | FTR | FTR | FTR | FTR | FTR |

| Question # | 75 | 49 | 87 | 67 | 84 | 41 | 85 |
|---|---|---|---|---|---|---|---|
| Total | 609 | 605 | 605 | 602 | 601 | 595 | 594 |
| Mean | 3.980392 | 3.980263 | 3.954248 | 3.934641 | 3.928105 | 3.888889 | 3.882353 |
| Variance | 0.914087 | 0.959873 | 1.057104 | 1.2457 | 1.027692 | 0.994152 | 0.986068 |
| Std Dev | 0.956079 | 0.979731 | 1.028155 | 1.116109 | 1.013751 | 0.997072 | 0.99301 |
| | | | | | | | |
| Numerator | -0.01931 | -0.01974 | -0.04575 | -0.06536 | -0.0719 | -0.11111 | -0.11765 |
| Denominator | 0.077294 | 0.076207 | 0.083121 | 0.090232 | 0.081957 | 0.080608 | 0.08028 |
| Test Stat | -0.25368 | -0.24918 | -0.55042 | -0.72435 | -0.87723 | -1.3784 | -1.46546 |
| | | | | | | | |
| One tail | | | | | | | |
| | | | | | | | |
| 99%test | 2.326 | 2.326 | 2.326 | 2.326 | 2.326 | 2.326 | 2.326 |
| | | | | | | | |
| 95%test | 1.645 | 1.645 | 1.645 | 1.645 | 1.645 | 1.645 | 1.645 |
| | | | | | | | |
| 90%test | 1.282 | 1.282 | 1.282 | 1.282 | 1.282 | 1.282 | 1.282 |
| | | | | | | | |
| 99% test | FTR | FTR | FTR | FTR | FTR | FTR | FTR |
| | | | | | | | |
| 95% test | FTR | FTR | FTR | FTR | FTR | FTR | FTR |
| | | | | | | | |
| 90% test | FTR | FTR | FTR | FTR | FTR | FTR | FTR |

| Question # | 19 | 69 | 68 | 21 | 32 | 73 | 83 |
|---|---|---|---|---|---|---|---|
| Total | 592 | 592 | 586 | 584 | 583.5 | 578 | 577 |
| Mean | 3.869281 | 3.869281 | 3.830065 | 3.816993 | 3.813725 | 3.777778 | 3.771242 |
| Variance | 0.877537 | 1.29859 | 1.326195 | 1.032078 | 0.999613 | 0.910819 | 1.032852 |
| Std Dev | 0.936769 | 1.139557 | 1.151606 | 1.015912 | 0.999806 | 0.954368 | 1.016293 |
| | | | | | | | |
| Numerator | -0.13072 | -0.13072 | -0.16993 | -0.18301 | -0.18627 | -0.22222 | -0.22876 |
| Denominator | 0.075733 | 0.092128 | 0.093102 | 0.082132 | 0.08083 | 0.077156 | 0.082162 |
| Test Stat | -1.72604 | -1.41889 | -1.82526 | -2.22821 | -2.30453 | -2.88016 | -2.78422 |
| | | | | | | | |
| One tail | | | | | | | |
| | | | | | | | |
| 99%test | 2.326 | 2.326 | 2.326 | 2.326 | 2.326 | 2.326 | 2.326 |
| | | | | | | | |
| 95%test | 1.645 | 1.645 | 1.645 | 1.645 | 1.645 | 1.645 | 1.645 |
| | | | | | | | |
| 90%test | 1.282 | 1.282 | 1.282 | 1.282 | 1.282 | 1.282 | 1.282 |
| | | | | | | | |
| 99% test | FTR | FTR | FTR | FTR | FTR | FTR | FTR |
| | | | | | | | |
| 95% test | FTR | FTR | FTR | FTR | FTR | FTR | FTR |
| | | | | | | | |
| 90% test | FTR | FTR | FTR | FTR | FTR | FTR | FTR |

| Question # | 86 | 28 | 77 | 11 | 64 | 72 | 33 |
|---|---|---|---|---|---|---|---|
| Total | 577 | 576.5 | 576 | 575 | 575 | 575 | 557 |
| Mean | 3.771242 | 3.767974 | 3.764706 | 3.75817 | 3.75817 | 3.75817 | 3.640523 |
| Variance | 0.98022 | 0.901402 | 1.115325 | 1.289818 | 1.013502 | 0.947712 | 0.771242 |
| Std Dev | 0.990061 | 0.949422 | 1.05609 | 1.135701 | 1.006728 | 0.973505 | 0.878204 |
| | | | | | | | |
| Numerator | -0.22876 | -0.23203 | -0.23529 | -0.24183 | -0.24183 | -0.24183 | -0.35948 |
| Denominator | 0.080042 | 0.076756 | 0.08538 | 0.091816 | 0.081389 | 0.078703 | 0.070999 |
| Test Stat | -2.85799 | -3.0229 | -2.75585 | -2.63385 | -2.97128 | -3.07268 | -5.06316 |
| | | | | | | | |
| One tail | | | | | | | |
| | | | | | | | |
| 99%test | 2.326 | 2.326 | 2.326 | 2.326 | 2.326 | 2.326 | 2.326 |
| | | | | | | | |
| 95%test | 1.645 | 1.645 | 1.645 | 1.645 | 1.645 | 1.645 | 1.645 |
| | | | | | | | |
| 90%test | 1.282 | 1.282 | 1.282 | 1.282 | 1.282 | 1.282 | 1.282 |
| | | | | | | | |
| 99% test | FTR | FTR | FTR | FTR | FTR | FTR | FTR |
| | | | | | | | |
| 95% test | FTR | FTR | FTR | FTR | FTR | FTR | FTR |
| | | | | | | | |
| 90% test | FTR | FTR | FTR | FTR | FTR | FTR | FTR |

| Question # | 76 | 14 | 78 | 31 | 13 | 12 | 20 |
|---|---|---|---|---|---|---|---|
| Total | 552 | 534 | 532 | 525 | 521.5 | 512.5 | 475 |
| Mean | 3.607843 | 3.490196 | 3.477124 | 3.431373 | 3.408497 | 3.349673 | 3.104575 |
| Variance | 1.016254 | 1.409443 | 1.040592 | 1.062693 | 1.537625 | 1.602253 | 1.75215 |
| Std Dev | 1.008094 | 1.1872 | 1.020094 | 1.03087 | 1.24001 | 1.265801 | 1.323688 |
| | | | | | | | |
| Numerator | -0.39216 | -0.5098 | -0.52288 | -0.56863 | -0.5915 | -0.65033 | -0.89542 |
| Denominator | 0.0815 | 0.095979 | 0.08247 | 0.083341 | 0.100249 | 0.102334 | 0.107014 |
| Test Stat | -4.81177 | -5.3116 | -6.34022 | -6.82291 | -5.90035 | -6.35494 | -8.36737 |
| | | | | | | | |
| One tail | | | | | | | |
| | | | | | | | |
| 99%test | 2.326 | 2.326 | 2.326 | -2.326 | -2.326 | -2.326 | -2.326 |
| | | | | | | | |
| 95%test | 1.645 | 1.645 | 1.645 | -1.645 | -1.645 | -1.645 | -1.645 |
| | | | | | | | |
| 90%test | 1.282 | 1.282 | 1.282 | -1.282 | -1.282 | -1.282 | -1.282 |
| | | | | | | | |
| 99% test | FTR | FTR | FTR | FTR | FTR | FTR | FTR |
| | | | | | | | |
| 95% test | FTR | FTR | FTR | FTR | FTR | FTR | FTR |
| | | | | | | | |
| 90% test | FTR | FTR | FTR | FTR | FTR | FTR | FTR |

| Question # | 70 | 71 | 43 | 18 | 40 | 42 | 17 |
|---|---|---|---|---|---|---|---|
| Total | 452.5 | 450.5 | 440 | 432 | 428 | 426 | 398 |
| Mean | 2.957516 | 2.944444 | 2.875817 | 2.823529 | 2.797386 | 2.784314 | 2.601307 |
| Variance | 0.907723 | 0.959064 | 1.03053 | 1.291022 | 1.175783 | 0.986068 | 1.136051 |
| Std Dev | 0.952745 | 0.979318 | 1.01515 | 1.136231 | 1.084335 | 0.99301 | 1.065857 |
| | | | | | | | |
| Numerator | -1.04248 | -1.05556 | -1.12418 | -1.17647 | -1.20261 | -1.21569 | |
| Denominator | 0.077025 | 0.079173 | 0.08207 | 0.091859 | 0.087663 | 0.08028 | |
| Test Stat | -13.5344 | -13.3322 | -13.6979 | -12.8074 | -13.7186 | -15.1431 | |
| | | | | | | | |
| One tail | | | | | | | |
| | | | | | | | |
| 99%test | -2.326 | -2.326 | -2.326 | -2.326 | -2.326 | -2.326 | |
| | | | | | | | |
| 95%test | -1.645 | -1.645 | -1.645 | -1.645 | -1.645 | -1.645 | |
| | | | | | | | |
| 90%test | -1.282 | -1.282 | -1.282 | -1.282 | -1.282 | -1.282 | |
| | | | | | | | |
| 99% test | FTR | FTR | FTR | FTR | FTR | FTR | |
| | | | | | | | |
| 95% test | FTR | FTR | FTR | FTR | FTR | FTR | |
| | | | | | | | |
| 90% test | FTR | FTR | FTR | FTR | FTR | FTR | |

## Appendix F: Significant Factors Not Measured by BCAS

| Question Number | Performance Factor |
|---|---|
| 46 | Number of purchase requests over 120 days |
| 45 | Number of purchase requests over 90 days |
| 44 | Percent of time BCAS is available to users |
| 37 | Number of man-hours expended to support deployments, etc. |
| 35 | Number of amendments due to contracting error |
| 36 | Number of customer education classes provided |
| 22 | Number of protests successfully defended |
| 39 | Number of in-house proficiency training sessions |
| 10 | Number of open purchase requests |
| 16 | Total number of delinquent contractors |
| 30 | Number of interest payments paid due to late processing of contractor invoice |
| 47 | Number of vendor follow-ups due to late delivery |
| N/A | Customer support and satisfaction |

* based on input from write-in response

# Appendix G: ACC BCAS Data

| Question Number | 15 | 62 | 90 | 88 | 61 | 89 | 91 | 26 |
|---|---|---|---|---|---|---|---|---|
| ACC CONUS | | | | | | | | |
| Caswell | 1 | 10928 | 40 | 55 | 2984 | 11 | 4 | 17648 |
| Bergstrom | 56 | 16944 | 79 | 129 | 4733 | 30 | 16 | 47599 |
| Dyess | 2 | 21497 | 51 | 104 | 3371 | 47 | 6 | 17893 |
| Ellsworth | 0 | 15379 | 95 | 178 | 3037 | 69 | 13 | 35141 |
| F.E. Warren | 15 | 18246 | 50 | 124 | 3675 | 51 | 9 | 24266 |
| George | 0 | 6901 | 26 | 34 | 1533 | 6 | 2 | 11087 |
| Cannon | 7 | 13720 | 29 | 127 | 3381 | 90 | 6 | 26916 |
| Shaw | 15 | 28616 | 149 | 244 | 13158 | 64 | 26 | 23104 |
| Holloman | 10 | 32656 | 55 | 206 | 10313 | 78 | 70 | 38666 |
| Langley | 3 | 40922 | 47 | 180 | 15808 | 96 | 34 | 32033 |
| McConnell | 18 | 18439 | 25 | 81 | 3666 | 37 | 8 | 20519 |
| Offut (3908th) | 0 | 1336 | 88 | 135 | 0 | 13 | 33 | 1979 |
| Homestead | 0 | 25955 | 103 | 241 | 5708 | 121 | 14 | 24951 |
| McDill | 127 | 41505 | 78 | 272 | 14166 | 118 | 66 | 92658 |
| KI Sawyer | 60 | 12249 | 34 | 125 | 2171 | 82 | 8 | 17067 |
| Grand Forks | 23 | 28446 | 57 | 131 | 5826 | 65 | 6 | 509[illegible] |
| Loring | 9 | 10524 | 35 | 78 | 1446 | 28 | 4 | 17322 |
| Moody | 13 | 12553 | 72 | 198 | 1778 | 112 | 13 | 19517 |
| Offut (55 Cons) | 1 | 44796 | 145 | 271 | 11741 | 100 | 26 | 47650 |
| Pope | 34 | 22138 | 43 | 100 | 7857 | 47 | 9 | 12760 |
| Nellis | 205 | 35721 | 102 | 192 | 16053 | 66 | 13 | 36381 |
| Myrtle Beach | 0 | 4156 | 20 | 27 | 874 | 5 | 1 | 7618 |
| Mountain Home | 0 | 20738 | 39 | 111 | 5867 | 49 | 18 | 24680 |
| Eaker | 0 | 3660 | 13 | 22 | 2282 | 6 | 1 | 12276 |
| Barksdale | 5 | 18280 | 61 | 121 | 4718 | 49 | 10 | 39892 |
| Beale | 8 | 9421 | 30 | 104 | 1163 | 66 | 6 | 26472 |
| Castle | 8 | 10484 | 47 | 65 | 1897 | 12 | 5 | 22075 |
| Fairchild | 1 | 23126 | 35 | 85 | 4907 | 40 | 3 | 34055 |
| Davis-Mothan | 0 | 32078 | 67 | 149 | 7301 | 67 | 15 | 66608 |
| Griffis | 27 | 21091 | 108 | 275 | 2904 | 93 | 62 | 43087 |
| Minot | 56 | 17258 | 66 | 164 | 1916 | 86 | 9 | 33962 |
| Luke | 21 | 29585 | 159 | 442 | 9130 | 210 | 72 | 25138 |
| Seymour-Johnson | 3 | 15206 | 40 | 136 | 2588 | 70 | 21 | 24014 |
| Langley | 0 | 1005 | 71 | 125 | 15 | 0 | 52 | 1875 |
| Tyndall | 83 | 39854 | 140 | 229 | 8202 | 38 | 39 | 45160 |
| Wurtsmith | 22 | 7266 | 33 | 50 | 3072 | 10 | 2 | 9486 |
| Whiteman | 13 | 13592 | 49 | 91 | 4162 | 29 | 13 | 27753 |
| | | | | | | | | |
| **Total** | 849 | 726271 | 2381 | 5401 | 193403 | 2161 | 715 | 1060231 |
| **Average** | 22.95 | 19628.95 | 64.35 | 145.97 | 5227.1 | 58.41 | 19.32 | 28654.89 |
| **Minimum** | 0 | 1005 | 13 | 22 | 0 | 0 | 1 | 1875 |
| **Maximum** | 205 | 44796 | 159 | 442 | 16053 | 210 | 72 | 92658 |

| Question Number | 24 | 65 |
|---|---|---|
| ACC CONUS | | |
| Carswell | 99.78 | 1439 |
| Bergstrom | 98.36 | 1580 |
| Dyess | 98.67 | 777 |
| Ellsworth | 99.51 | 1280 |
| F.E. Warren | 99.92 | 1022 |
| George | 99.42 | 754 |
| Cannon | 98.31 | 1241 |
| Shaw | 99.94 | 1677 |
| Holloman | 98.83 | 1423 |
| Langley | 98.44 | 2259 |
| McConnell | 99.67 | 1445 |
| Offut (3908th) | 69.8 | 730 |
| Homestead (HC) | 99.22 | 1702 |
| McDill | 95.93 | 3510 |
| KI Sawyer | 98.84 | 1211 |
| Grand Forks | 99.82 | 1460 |
| Loring | 96.29 | 809 |
| Moody | 99.38 | 718 |
| Offut (55 Cons) | 98.93 | 2252 |
| Pope | 99.36 | 1099 |
| Nellis | 95.89 | 1919 |
| Myrtle Beach | 95.93 | 626 |
| Mountain Home | 99.61 | 1076 |
| Eaker (close) | 100 | 492 |
| Barksdale | 99.24 | 1397 |
| Beale | 99.78 | 989 |
| Castle | 98.32 | 787 |
| Fairchild | 98.22 | 1300 |
| Davis-Mothan | 99.58 | 1505 |
| Griffis | 93.04 | 1882 |
| Minot | 99.59 | 1171 |
| uke | 98.84 | 2506 |
| Seymour-Johnson | 99.19 | 1743 |
| Langley | 93.44 | 638 |
| Tyndall | 98.09 | 1420 |
| Wurtsmith | 98.62 | 785 |
| Whiteman | 97.98 | 1290 |
| | | |
| **Total** | N/A | 49969 |
| **Average** | 97.67 | 1350.51 |
| **Minimum** | 69.80 | 492 |
| **Maximum** | 100 | 3510 |

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## Vita

Captain Mark W. Fahrenkamp was born on 29 February 1960 in Sacramento, California. He graduated from Wright State University in 1983 with a Bachelor of Science in Business Management. In August 1983, he received his commission into the United States Air Force and began his active duty 2 January 1984. His first assignment was to Fairchild AFB, WA where he first served as a Contracting Management Officer for two years and then Chief, Quality Assurance Evaluation Division for one year. He attended Squadron Officer School in 1986 prior to being assigned to Anderson AFB, Guam as the Deputy Chief, Contracting Division. Upon being selected for the rank of captain, he was offered and accepted a regular commission into the United States Air Force. Returning to the CONUS in 1988, he was assigned to K.I. Sawyer AFB, MI as the Chief, Contracting Division. Upon activation of the 410th Contracting Squadron at K.I. Sawyer in 1992, he was selected as the squadron's first commander. In 1992, he was accepted into the School of Logistics and Acquisition Management at the Air Force Institute of Technology. Upon graduation, he will be assigned to the F-16 System Program Office (SPO), Wright-Patterson AFB, as a contracts manager.

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## Vita

Captain Mark P. Garst was born on 16 March 1966 in Milton, Florida. He graduated from Rock Bridge High School in Columbia, Missouri in 1984 and attended the United States Air Force Academy, graduating with a Bachelor of Science in Management in June 1988. Upon graduation, he received a regular commission in the USAF and served his first tour of duty at Plattsburgh AFB, New York. While at Plattsburgh AFB, he served as a Squadron Section Commander for both the 380th Civil Engineering and the 380th Field Maintenance Squadrons. While serving in these positions he was responsible for the administrative and judicial actions involving over 800 military personnel. There he was also responsible for directing the consolidation of the Avionics and Munitions Maintenance Squadrons into the Field Maintenance Squadron. In addition, he was responsible for the following programs: personnel reliability, nuclear surety, disaster preparedness, and security. In May 1992 he entered the School of Systems and Logistics, Air Force Institute of Technology, studying Contracting Management. Upon graduation from AFIT in September 1993, he will be assigned to Wright Laboratory, Wright-Patterson AFB.

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